

# A REVIEW OF THE PHILIPPINE LAND MAMMALS IN THE UNITED STATES NATIONAL MUSEUM.

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## INTRODUCTION.

The Philippine mammals in the United States National Museum number 1,454 specimens. This is probably by far the largest collection from the archipelago in any museum. Several papers dealing more or less fully with certain groups or describing new species in the collection have been published from time to time, but no account of the collection as a whole has ever been printed. Since many unpublished island records of great interest to workers in Philippine mammalogy will be made available by the presentation of a complete list of this splendid collection, the following catalogue has been prepared.

More than two-thirds of the specimens from the islands have been contributed by Dr. Edgar A. Mearns alone, and many others have reached the museum from various collectors solely through his efforts. A small collection of specimens, many of special interest, sent for determination by the Philippine Bureau of Science, is listed in the present report. Material from this source, mostly collected by Richard C. McGregor and A. Celestino, is credited throughout the list by the initials "P. B. S."

Following is a list of the collectors and a summary of the specimens examined and listed in the preparation of this report:

Dr. Edgar A. Mearns.....	1,012
Philippine Bureau of Science.....	98
J. B. Steere.....	87
Dr. Paul Bartsch.....	57
Dr. Robert B. Grubbs.....	35
George C. Lewis.....	28
Dr. Carroll Fox.....	26
D. B. Mackie.....	23
L. M. McCormick.....	20
Wm. D. Carpenter.....	10
John Whitehead.....	10

Dr. J. C. Le Hardy.....	9
Government Board, Pan-American Exposition.....	8
Dr. C. L. Forbush.....	4
Henry Musser.....	4
Dr. H. N. Kierulff.....	3
Col. E. B. Babbitt and Capt. F. R. McCoy.....	2
Robert A. Schroder.....	2
U. S. Bureau of Fisheries.....	2
W. L. Merritt.....	1
Mrs. F. D. Grant.....	1
Capt. Luther S. Kelly.....	1
Capt. G. F. Chase.....	1
F. Lamson-Scribner.....	1
Dr. E. H. Porter.....	1
H. Cuming.....	1
British Museum.....	1
Dr. J. R. Harris.....	1
E. L. Moseley.....	1
Collector unknown.....	4
Total number specimens.....	1, 454

LIST OF PUBLISHED PAPERS BASED WHOLLY OR IN PART ON THE  
PHILIPPINE MAMMALS IN THE UNITED STATES NATIONAL  
MUSEUM.

ANDERSEN, KNUD. On the Bats of the *Rhinolophus arcuatus* Group, with Descriptions of Five new Forms. Ann. and Mag. Nat. Hist., ser. 7, vol. 16, pp. 281-288, September, 1905.

Describes *Rhinolophus inops* from the Mearns collection (p. 284).

———. On the Bats of the *Rhinolophus macrotis* Group, with Descriptions of Two new Forms. Ann. and Mag. Nat. Hist., ser. 7, vol. 16, pp. 289-292, September, 1905.

Describes *Rhinolophus hirsutus*, type in the U. S. National Museum.

———. On Some Bats of the Genus *Rhinolophus*, with Remarks on their Mutual Affinities, and Descriptions of Twenty-six new Forms. Proc. Zool. Soc. London, 1905, vol. 2, pp. 75-145, pls. 3, 4. October 17, 1905.

Much of the material from the Philippine Islands representing this genus was examined by the author, and one new species, *Rhinolophus virgo*, was described from the U. S. National Museum collections (pp. 88-89).

———. On *Hipposiderus diadema* and its closest Allies. Ann. and Mag. Nat. Hist., ser. 7, vol. 16, pp. 497-507, November, 1905.

———. A List of the Species and Subspecies of the Genus *Rhinolophus*, with some Notes on their Geographical Distribution. Ann. and Mag. Nat. Hist., ser. 7, vol. 16, pp. 648-662, December, 1905.

———. Catalogue of the Chiroptera in the Collection of the British Museum. Second Edition. Vol. 1: Megachiroptera, pp. i-ci; 1-854. 1912.

ELLIOT, DANIEL GIRAUD. A Review of the Primates. Monograph No. 1, Amer. Mus. Nat. Hist., 1913, vol. 1, pp. i-cxxvii; 1-317; i-xxxviii; numerous plates.

U. S. National Museum specimens of *Tarsius* from the Philippines described by the author.

Vol. 2, pp. i-xviii; 1-382; i-xxvi, numerous plates.

U. S. National Museum specimens of *Pithecus* from the Philippines described by the author.

- HOLLISTER, N. Two New Species of *Epimys* from Luzon. Proc. Biol. Soc. Washington, vol. 24, pp. 89-90, May 15, 1911.  
Describes *Epimys calcis* and *E. querceti* from Luzon.
- . A List of the Mammals of the Philippine Islands, exclusive of the Cetacea. Philippine Journ. Sci., sec. D, vol. 7, No. 1, pp. 1-64, February, 1912.
- . Two New Philippine Fruit Bats. Proc. Biol. Soc. Washington, vol. 26, pp. 111-112, May 3, 1913.  
Original descriptions of *Pteropus balutus* and *P. mearnsi*.
- LYON, MARCUS WARD, JR. Remarks on the Insectivores of the Genus *Gymnura*. Proc. U. S. Nat. Mus., vol. 36, pp. 449-456, pls. 34-37, May 27, 1909.  
Figures the skull, dentition, and alcoholic specimen—the type—of *Podogymnura truci* (pls. 35, 36, 37).
- . Treeshrews: An Account of the Mammalian Family Tupaiidae. Proc. U. S. Nat. Mus., vol. 45, pp. 1-187, pls. 1-5. 1913.
- MEARNS, EDGAR A. Descriptions of New Genera and Species of Mammals from the Philippine Islands. Proc. U. S. Nat. Mus., vol. 28, pp. 425-460. 1905.  
Describes six new genera and twenty-five new species; the genus *Cynomolgus* (= *Pithecus*) is treated monographically. The new genera and species from the Philippine collection are: *Cynomolgus mindanensis*, *C. m. apoensis*, *C. suluensis*, *C. cagayanus*, *Pteropus lanensis*, *P. cagayanus*, *Urogale*, *U. cylindrura*, *Podogymnura*, *P. truci*, *Mus tagalayensis*, *M. albigularis*, *M. magnirostris*, *M. mindanensis*, *M. zamboangae*, *M. kelleri*, *M. todayensis*, *M. vulcani*, *M. v. apicis*, *M. pantarensis*, *M. commissarius*, *Bullimus*, *B. bagobus*, *Limnomys*, *L. sibuanus*, *Tarsomys*, *T. apoensis*, *Apomys*, *A. hylocates*, *A. petracus* and *A. insignis*.
- MILLER, GERRIT S., JR. A Second Specimen of *Odontonycteris meyeri* Jentink. Proc. Biol. Soc. Washington, vol. 18, p. 253, December 9, 1905.
- . The Families and Genera of Bats. Bull. 57, U. S. National Museum, pp. i-xvii, 1-282, pls. 1-14. 1907.
- . Descriptions of Two New Genera and Sixteen New Species of Mammals from the Philippine Islands. Proc. U. S. Nat. Mus., vol. 38, pp. 391-404, pls. 18-20. August 19, 1910.  
Describes the following genera and species from the National Museum collection: *Crociodura halconus*, *C. beatus*, *C. mindorus*, *C. grandis*, *Pteropus pumilus*, *Chilophylla*, *C. hirsuta*, *Taphozous Pluto*, *Epimys gala*, *Tryphomys*, *T. adustus*, *Batomys dentatus*, *Apomys bardus*, *A. major*, and *A. musculus*. Several new species in the collection of the Philippine Bureau of Science are also named.
- . Note on the *Mus commissarius* of Mearns. Proc. Biol. Soc. Washington, vol. 24, p. 38, February 24, 1911.
- . The Cranial and Dental Characters of *Chilophylla*. Proc. Biol. Soc. Washington, vol. 25, p. 117, June 29, 1912.
- . A New Pteropine Bat from Luzon. Proc. Biol. Soc. Washington, vol. 26, pp. 73-74, March 22, 1913.  
Original description of *Eonycteris robusta*, from Montalban, Luzon.
- The following 18 new species are described in the present paper:

*Pachyura occultidens*. See page 303.  
*Taphonycteris capito*. See page 308.  
*Miniopterus paululus*. See page 311.  
*Chaerephon luzonus*. See page 312.  
*Nannosciurus surrutilus*. See page 313.  
*Epimys coloratus*. See page 317.  
*Epimys robiginosus*. See page 318.  
*Epimys mayonicus*. See page 319.  
*Epimys leucophæatus*. See page 320.

*Epimys vigoratus*. See page 321.  
*Epimys basilanus*. See page 322.  
*Epimys ornatulus*. See page 322.  
*Epimys benquetensis*. See page 323.  
*Limnomys mearnsi*. See page 324.  
*Limnomys picinus*. See page 325.  
*Apomys microdon*. See page 327.  
*Pithecus mindorus*. See page 328.  
*Rusa nigellus*. See page 332.

## Family ERINACEIDÆ.

## PODOGYMNURA TRUEI Mearns.

*Specimen*.—One, the type, from Mindanao: Mount Apo (Mearns).

## Family SORICIDÆ.

## PACHYURA LUZONIENSIS (Peters).

*Specimens*.—One hundred and seventy-five, from the following localities:

Luzon: Malabon, 9 (Carpenter); Manila, 164 (Mearns, P. B. S., Fox, Lewis); Porto Real, 1 (Lewis); San Fernando de Union, 1 (Lewis).

There is an immense and most puzzling variation in size in the large series of specimens from the vicinity of Manila Bay, but after long study I am forced to believe that it is genuine individual variation within a single species. Measurements, average and extreme, of the hind foot, without claws, of 125 specimens from Manila is 18.8 (15–21.7) mm. This almost unparalleled variation may be due to an admixture of races from the shipping in the harbor, as *Pachyura* is a well-known rival of the house rat and house mouse about buildings, and has been captured on vessels. Series of specimens from remote parts of Luzon are much needed for comparison with the Manila specimens.

In the following table of cranial and dental measurements, only fully adult skulls, with basal suture obliterated, or at least tightly closed, are used. Even in the oldest specimens the teeth show comparatively little wear.

*Measurements of selected adult skulls of Pachyura luzoniensis from Manila.*

Number.	Sex.	Condyl- basal length.	Zygo- matic breadth.	Mastoid breadth.	Inter- orbital breadth.	Palatal length.	Mandible.	Maxillary tooth row (entire).	Mandibular tooth row (entire).
		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
142859.....	Male.....	36	9.7	12.5	5.8	13	17.1	13.4	11.8
142879.....	do.....	31.8	9.6	13.2	5.6	13.5	17	13.7	12.4
142875.....	do.....	31.7	9.8	13.7	5.9	14.7	17.4	13.6	12
142882.....	do.....	30.9	10.2	13.2	5.9	13.5	17	13.4	12.1
142898.....	do.....	31.4	9.9	13.8	5.8	13	16.8	13.2	12
142899.....	do.....	39.6	9.4	12.2	5.7	13	16	13.2	12
142903.....	do.....	28.7	8.8	12	5.3	12.2	15.6	12.4	11.5
142913.....	do.....	28.5	9.1	11.9	5.3	12.4	16.1	12.5	11.5
142921.....	do.....	28.8	8.7	11.9	5.7	12.1	14.8	12.6	11.6
142961.....	do.....	29.1	9.4	12.3	5.6	12.9	15.6	12.8	11.9
143025.....	do.....	32.6	10.1	14.5	5.9	13.5	17.1	13.5	12.4
144646.....	do.....	29.4	9.7	12.4	5.7	13.1	16.3	12.9	11.6
173871.....	do.....	32.7	9.9	13.9	6.1	14	17.9	13.5	12.5
101487.....	Female.....	30.7	9.5	13.2	5.7	13	16.5	13.1	12
142936.....	do.....	26.6	8.4	11.3	5.2	11.7	14.1	11.7	10.7
142941.....	do.....	27	8.4	11.3	5.2	11.6	14.6	12	11.1
142945.....	do.....	25.7	8.4	11	5	11.6	14.5	11.6	10.8
142960.....	do.....	26.9	8.8	11.9	5.4	11.9	14.2	12	11.1
142967.....	do.....	26.8	8.7	11.7	5.2	11.6	15	12	11.2



## PACHYURA OCCULTIDENS, new species.

*Type*.—From Ilo-ilo, Panay. Young adult male in alcohol, skull removed, Cat. No. 175761, U.S.N.M. Collected in August, 1912, by Dr. Carroll Fox.

*Diagnosis*.—Size large; in general much like larger specimens of *Pachyura luzoniensis*, but skull relatively wider interorbitally, and second unicuspid tooth very large, almost equal to third.

*Color* of specimens in alcohol indistinguishable from that of the Luzon species.

*Skull and teeth*.—Skull very much like that of *P. luzoniensis*, but heavier interorbitally. Teeth large, crowded, the rows shortened. First three unicuspid large, the second only slightly smaller than third; fourth unicuspid greatly reduced, lying entirely posterior to line between anterior tips of large premolars, and not visible from outer side; the large premolar, from this view, in contact with third unicuspid.

*Measurements of type* (from alcoholic specimen).—Head and body, 115 mm.; tail vertebrae, 70; hind foot, without claws, 19. Skull of type: Condylbasal length, 30.7; mastoid breadth, 13.6; least inter-orbital breadth, 5.7; upper tooth row, entire, 13.6; mandible, 17.0; lower tooth row, entire, 12.2.

*Specimens*.—Four, from the following localities:

Panay: Ilo-ilo, 2 (Fox).

Negros: 1 (Steere).

Mindanao: 1 (Steere).

The shrew originally described as *Crociodura edwardsiana*<sup>1</sup> is placed in the genus *Pachyura* in the Supplement to Trouessart's Catalogue, and I followed this disposition of the species in my recent list of Philippine mammal names.<sup>2</sup> I am lately informed by Doctor Trouessart that the type of the Sulu species is an undoubted *Crociodura*.

## CROCIDURA GRAYI Dobson.

*Specimens*.—Five, from Luzon: Hights-in-the-oaks, Benguet (Mearns).

## CROCIDURA HALCONUS Miller.

*Specimens*.—Seven, from the following localities: Mindoro: Bula-lacao, 1 (Mearns); Mount Halcon, 6, including the type (Mearns).

## CROCIDURA BEATUS Miller.

*Specimen*.—One, the type, from Mindanao: Mount Bliss (Mearns). This species and *C. halconus* are members of the *grayi* group.

## CROCIDURA MINDORUS Miller.

*Specimens*.—Two, the type and paratype, from Mindoro: Mount Halcon (Mearns).

<sup>1</sup> Trouessart, Le Naturaliste, No. 42, p. 330, 1880.

<sup>2</sup> Philippine Journ. Sci., sec. D, vol. 7, No. 1, February, 1912.

## CROCIDURA GRANDIS Miller.

*Specimen*.—One, the type, from Mindanao: Grand Malindang Mountain (Mearns).

## Family TUPAIIDÆ.

## TUPAIA PALAWANENSIS Thomas.

*Specimen*.—One, from Palawan: Puerte Princesa (P. B. S.).

## TUPAIA MÖLLENDORFFI Matschle.

*Specimens*.—Two, from Culion (P. B. S.).

## TUPAIA CUYONIS Miller.

*Specimens*.—Nine, including the type, from Cuyo (P. B. S.).

## UROGALE EVERETTI (Thomas).

1892. *Tupaia everetti* THOMAS, Ann. and Mag. Nat. Hist., ser. 6, vol. 9, p. 250, March.

1905. *Urogale cylindrura* MEARNs, Proc. U. S. Nat. Mus., vol. 28, p. 435.

1912. *Urogale cylindrura* and *Urogale everetti* HOLLISTER, Philippine Journ. Sci., vol. 7, sec. D, No. 1, p. 7, February.

1913. *Urogale everetti* LYON, Proc. U. S. Nat. Mus., vol. 45, p. 157.

*Specimens*.—Three, from the following localities: Mindanao: Mount Apo, 2 (Mearns); Mount Bliss, 1 (Mearns).

## Family GALEOPTERIDÆ.

## CYNOCEPHALUS VOLANS (Linnæus).

*Specimens*.—Twenty-three, from localities as follows:

Bohol: "Bohol," 4 (Furbush); Sevilla, 4 (P. B. S.).

Mindanao: Catagan, 1 (Mearns); Iligan, 1 (Grubbs); "Mindanao," 2 (Steere); Pantar, 1 (Mearns).

Basilan: Basilan, 2 (P. B. S., Schroder); Isabela, 8 (Mearns).

Skins and skulls from the various islands seem to be indistinguishable. All of the skins of males are dark brown, and all of females are gray.

Measurements of skulls of *Cynocephalus volans* from Isabela, Basilan.

No.	Sex.	Condylbasal length.	Zygomastic breadth.	Greatest breadth of rostrum.	Interorbital breadth.	Postorbital breadth.	Breadth brain-case above roots of zygomata.	Mandible.	Maxillary tooth row (entire).	Mandibular tooth row (entire).	Observations.
144658	Male....	mm. 65.7	mm. 43.5	mm. 24.7	mm. 18.4	mm. 15.1	mm. 24	mm. 50.6	mm. 33	mm. 35.8	Old.
144659	...do....	65.5	43.6	23.2	17	15.7	23.1	50.3	33.1	36.8	Adult.
144660	...do....	68.3	41.6	23.8	15.5	17.3	23.3	51.9	34.4	37.7	Young.
144662	...do....	61.1	42.1	24.3	17.1	17.7	24.3	48.4	32.3	35.7	Do.
144655	Female...	70.2	46.8	27	19.5	15.7	24.5	54.6	35.8	38.5	Adult.
144656	...do....	67	43.1	25	19.4	16.7	23.2	52.2	33.7	37.8	Do.

## Family PTEROPIDÆ.

## EONYCTERIS ROBUSTA Miller.

1913. *Eonycteris robusta* MILLER, Proc. Biol. Soc. Washington, vol. 31, p. 73, March 22.

*Specimen*.—One, the type, from Luzon: Montalban (Bartsch).

## ROUSETTUS AMPLEXICAUDATUS (Geoffroy).

*Specimens*.—Nine, from the following localities:

Luzon: Montalban, 5 (Bartsch).

Lubang: 1 (P. B. S.).

Negros: 3 (Steere).

## PTEROPUS HYPOMELANUS CAGAYANUS Mearns.

1905. *Pteropus cagayanus* MEARNs, Proc. U. S. Nat. Mus., vol. 28, p. 433.

1912. *Pteropus cagayanus* and *Pteropus hypomelanus hypomelanus* HOLLISTER, Philippine Journ. Sci., vol. 7, sec. D, No. 1, p. 9, February.

1912. *Pteropus hypomelanus cagayanus* ANDERSEN, Cat. Chiroptera Brit. Mus., vol. 1, p. 121.

*Specimens*.—Twenty-one, from the following localities:

Luzon: San Miguel, Ilocos Norte, 7 (Mearns).

Cuyo: 3 (Mearns).

Panay: Concepcion, 7 (Steere); "Panay," 1 (Steere).

Cagayan Sulu: 3, including the type (Mearns).

## PTEROPUS MEARNSI Hollister.

1913. *Pteropus mearnsi* HOLLISTER, Proc. Biol. Soc. Washington, vol. 26, p. 112, May 3.

*Specimens*.—Six, from localities as follows:

Mindanao: Zamboanga, 2 (Mearns).

Basilan: Isabela, 4, including the type (Mearns).

## PTEROPUS SPECIOSUS Andersen.

*Specimens*.—Eight, from the following localities:

Mindanao: Zamboanga, 1 (Mearns).

Malanipa: 7 (Mearns).

## PTEROPUS BALUTUS Hollister.

1913. *Pteropus balutus* HOLLISTER, Proc. Biol. Soc. Washington, vol. 26, p. 111, May 3.

*Specimen*.—One, the type, from Balut, Serangani Group (Mearns).

## PTEROPUS PUMILUS Miller.

*Specimens*.—Two, the type and paratype, from the following locality: Palmas: 2 (Mearns).

## PTEROPUS VAMPIRUS LANENSIS Mearns.

*Specimens*.—Thirty-three, from localities as follows:

Luzon: Batac, Ilocos Norte Province, 13 (Mearns); San Fernando de Union, 1 (Lewis).

- Panay: Concepcion, 1 (Steere).  
 Leyte: 1 (Steere).  
 Palawan: 1 (U. S. Fish Comm.).  
 Mindanao: Mercedes, 7 (Mearns); Panguil Bay, Tangob, 1 (Mearns);  
 Pantar, 1, the type (Mearns); Zamboanga, 3 (Mearns, Harris).  
 Cabo: 4 (Mearns).<sup>1</sup>

ACERODON JUBATUS JUBATUS (Eschscholtz).

*Specimens*.—Fifteen, from localities as follows:

- Luzon: Pasaeva, 1 (McCormick).  
 Mindoro: Bulacao, 3 (Mearns).  
 Leyte: 11 (Steere).

ACERODON JUBATUS MINDANENSIS Andersen.

*Specimens*.—Fifty-six, from the following localities:

- Mindanao: Zamboanga, 2 (Mearns).  
 Banga: Port Banga, 14 (Mearns).  
 Cabo: 40 (Mearns).

ACERODON LUCIFER (Elliot).

*Specimen*.—One topotype, from Panay: Concepcion (Steere).

MACROGLOSSUS LAGOCHILUS LAGOCHILUS Matschie.

1899. *Macroglossus lagochilus* MATSCHIE, Megachiroptera des Berliner Mus., p. 97.  
 1912. *Macroglossus lagochilus* and *Odontonycteris meyeri* HOLLISTER, Philippine Journ. Sci., vol. 7, sec. D, p. 11, February.  
 1912. *Macroglossus lagochilus lagochilus* ANDERSEN, Cat. Chiroptera Brit. Mus., vol. 1, p. 165.

*Specimens*.—Two, as follows:

- Cagayan Sulu: 1 (Mearns).  
 Philippine Islands: 1 (Exch. Brit. Mus.).

The bat described by Dr. Jentink as *Odontonycteris meyeri*, and later recorded from Cagayan Sulu by Miller, proves to be identical with *Macroglossus lagochilus*.<sup>2</sup>

Family EMBALLONURIDÆ.

EMBALLONURA ALECTO (Eydoux and Gervais).

1839. *Vespertilio* (*Nycticeus*) *alecto* EYDOUX and GERVAIS, Voy. autour du Monde, vol. 5, pt. 2, p. 7. (Manila, Luzon.)  
 1862. *Emballonura discolor* PETERS, Monatsb. Königl. Preuss. Akad. (1861), p. 711. (Paracali, Luzon.)  
 1912. *Emballonura monticola* HOLLISTER, Philippine Journ. Sci., vol. 7, sec. D, p. 12, February. (Not of Temminck, 1838.)

*Specimens*.—Ten, from the following locality: Guimarás: 10 (Steere).

<sup>1</sup> Cabo Island, in Igat Bay, South Mindanao.

<sup>2</sup> See Andersen, Cat. Chirop. Brit. Mus., vol. 1, p. 754, 1912. The genus and species were based on an abnormal specimen.

The Guimarás specimens differ from Bornean examples of *E. monticola* in the smaller size of the skulls. The earliest name for the form represented is *alecto* Eydoux and Gervais. The Guimarás bats agree very well with the original description of *alecto*, and the measurements are much the same. The only discrepancy is that Eydoux and Gervais placed their *alecto* in a subgeneric group (*Nycticeus*), one of their characters for which is the presence of only two upper incisors. Dobson places *alecto* in the synonymy of *E. monticola*, without comment, and the name doubtless refers to the Philippine species we have been calling *E. monticola*. The measurements given by Dobson for *monticola*, and apparently taken from his Luzon specimen, do not agree with the measurements given by Eydoux and Gervais nor with the measurements given by Peters, and refer to a much smaller bat. The *Emballonura discolor* of Peters is a synonym of *E. alecto*, as here understood. The lengths of forearms in the ten Guimarás specimens are 46.2 mm, 44.2, 45, 45.5, 45.9, 45, 47, 45.7, 42, 44.

TAPHOZOUS PHILIPPINENSIS Waterhouse.

*Specimens*.—Thirty, from the following localities: Luzon: Malabon, 22 (Mearns); Montalban, 8 (Bartsch).

*External measurements of alcoholic specimens of Taphozous philippinensis from Luzon.*

Locality.	Number.	Sex.	Forearm.	Second digit metacarpal.	Ear from crown.	Ear from notch.	Tragus from ear notch.	Foot with claws.	Free portion of tail.
			mm.	mm.	mm.	mm.	mm.	mm.	mm.
Malabon..	144851	Male....	62.4	50.3	15.2	21.7	7.5	11.5	.....
Do.....	144853	do.....	62.3	51.4	15.5	21.5	7.5	11.5	14.2
Do.....	144854	do.....	63.9	54.5	16	21	6.5	10.2	16.5
Do.....	144856	do.....	62.3	52.2	17.2	20	6.7	11.5	17
Do.....	144858	do.....	63.3	51.4	14.5	21	8	12	17
Do.....	144859	do.....	62.9	52.1	15	22	6.5	11	12.6
Do.....	144861	do.....	64.4	53	13.5	20.2	7	11.5	15
Do.....	144863	do.....	62.4	51.5	15.1	21.1	7.4	11	14.2
Do.....	144864	do.....	61.7	51.5	16	21.2	6.8	11	14.2
Do.....	144865	do.....	62.3	52	14.3	21.2	7.9	10.7	12.5
Do.....	144866	do.....	63.9	54	16	22.4	7.4	12.4	14.5
Do.....	144867	do.....	65.3	53	12.2	22.9	7.6	12	15.4
Montalban	<sup>1</sup> 175841	do.....	58.7	48.8	15.2	20	6	11.4	.....
Malabon..	144852	Female	60.4	50	16.1	21.4	7.4	10.5	15
Do.....	144855	do.....	64.4	52.5	15.5	20	6	11	14
Do.....	144857	do.....	59.3	50	16	21	7	11.2	15.5
Do.....	144860	do.....	65.6	53.5	15.4	20	6.7	11.5	16
Do.....	144862	do.....	64.9	54	16	22	7	12	15
Do.....	144868	do.....	64.3	51.7	15.2	22	7.5	11.6	12
Montalban	175836	do.....	63.2	51	17	20.6	7.2	10.1	.....
Do.....	175837	do.....	63.4	54	14.8	22	7.2	11	15.2
Do.....	<sup>1</sup> 175838	do.....	58.7	46.5	14.5	21.8	6.4	10.8	17.5
Do.....	175839	do.....	61.7	50.5	17	21.5	5.7	12	14.9
Do.....	<sup>1</sup> 175840	do.....	57.9	46	15.3	19.5	6	10.9	14.2
Do.....	175842	do.....	63.1	51.5	14.5	21	7	11.4	15
Do.....	<sup>1</sup> 175843	do.....	59.8	48	14.6	18.8	6.9	10.9	15.5

<sup>1</sup> Young.

TAPHONYCTERIS PLUTO (Miller).

1910. *Taphozous pluto* MILLER, Proc. U. S. Nat. Mus., vol. 38, p. 396, August 19.

*Specimen*.—One, the type, from Mindanao: Mercedes (Mearns).

The specimens on which the Luzon record, from Miller, in the "List of Mammals of the Philippine Islands," <sup>1</sup> 1912, was based,

<sup>1</sup> Philippine Journ. Sci., vol. 7, sec. D, p. 12, February, 1912.

came from Pandan, Catanduanes Island, and represent another species, described below.

**TAPHONYCTERIS CAPITO, new species.**

*Type*.—From Pandan, Catanduanes Island. Adult female, skin and skull, U. S. National Museum, No. 155149. Collected in 1909 by D. B. Mackie.

*Diagnosis*.—Like *Taphonycteris pluto*, from Mindanao, but slightly smaller, with shorter pollex, uniformly shorter metacarpals, and smaller claws. Skull larger, especially broader; teeth actually smaller.

*Color*.—Upperparts rich brownish-black, sparingly spotted with white on head, back, and rump. Underparts sepia, marbled with whitish. Wings and interfemoral membrane, in dry skin, intense black. An immature topotype is almost pure black above, with no white markings.

*Skull and teeth*.—The skull, compared with skull of *T. pluto*, is larger, especially broader; rostral portion much more massive, with greater interorbital breadth. Teeth actually smaller than in *pluto*.

*Measurements of type*.—Forearm, 73 mm.; third finger, 119; third finger metacarpal, 71.5; fourth finger metacarpal, 51.1; fifth finger, 67; fifth finger metacarpal, 36. Skull: Condylbasal length, 21.6; zygomatic breadth, 16.1; mastoid breadth, 13.9; breadth of braincase, 11.0; postorbital constriction, 5.1; interorbital constriction, 8.7; maxillary tooth row, 10.2; mandible, 18.7; mandibular tooth row, 11.9.

*Specimens*.—Two, from Catanduanes: Pandan (Mackie).

In addition to the external characters assigned to the subgenus *Taphonycteris* by Dobson, are peculiarities of the skull and teeth which make it seem of generic value. Chief among these are the total lack of emargination on the inner side of the audital bullæ, and the large proportional size of the small upper premolar.

**MEGADERMA SPASMA SPASMA (Linnæus).**

*Specimens*.—Three, from localities as follows:

Mindanao: Catagan, 1 (Mearns); Iligan, 1 (Grubbs).

Philippine Islands: 1 (P. B. S.).

**Family RHINOLOPHIDÆ.<sup>1</sup>**

**RHINOLOPHUS VIRGO Andersen.**

*Specimens*.—Three, including the type, from Luzon: Pasacao, South Camarines Province (McCormick).

**RHINOLOPHUS HIRSUTUS Andersen.**

*Specimen*.—One, the type: Guimarás (Steere).

<sup>1</sup> With the exception of the Philippine Bureau of Science material, specimens from each lot listed under the various species of this genus have been determined at the British Museum by Dr. Knud Andersen.

## RHINOLOPHUS ARCUATUS ARCUATUS Peters.

*Specimens*.—Fifty-seven, from localities as follows:

Luzon: Irian, Benguet, 17 (P. B. S.); Montalban, 35 (Bartsch); Pasacao, South Camarines, 4 (McCormick).

Mindanao: Mount Halcon, 1 (Mearns).

## RHINOLOPHUS ARCUATUS EXIGUUS Andersen.

*Specimens*.—Five, from Guimarás (Steere).

## RHINOLOPHUS SUBRUFUS Andersen.

*Specimens*.—Three, from the following localities:

Luzon: Irian, Benguet, 2 (P. B. S.).

Mindanao: Mount Apo, 1 (Mearns).

## RHINOLOPHUS INOPS Andersen.

*Specimen*.—One, the type, from Mindanao: Mount Apo (Mearns).

Family HIPPOSIDERIDÆ.<sup>1</sup>

## HIPPOSIDEROS ANTRICOLA (Peters).

*Specimens*.—Two, from localities as follows:

Luzon: Pasacao, South Camarines, 1 (McCormick).

Mindanao: Cottabato, Rio Grande, 1 (Mearns).

## HIPPOSIDEROS DIADEMA GRISEUS (Meyen).

*Specimens*.—Nineteen, from the following localities:

Luzon: Malolos Bulacan, 3 (Lewis); Montalban, 3 (Bartsch).

Catanduanes: Baras, 2 (Mackie); Pandan, 1 (Mackie).

Guimarás: 8 (Steere; Moseley).

Mindanao: Mount Apo, 1 (Mearns); Zamboanga, 1 (Mearns).

## HIPPOSIDEROS PYGMÆUS (Waterhouse).

*Specimens*.—Fourteen, from localities as follows: Luzon, Montalban, 3 (Bartsch); Pasacao, South Camarines, 11 (McCormick).

## CHILOPHYLLA HIRSUTA Miller.

*Specimen*.—One, the type, from Mindoro: Alag River (Mearns).

## Family VESPERTILIONIDÆ.

## MYOTIS RUFOPICTUS (Waterhouse).

1845. *Vespertilio rufo-pictus* WATERHOUSE, Proc. Zool. Soc. London, p. 3. (Philippine Islands.)

1912. *Myotis formosus* HOLLISTER, Philippine Journ. Sci., vol. 7, sec. D., p. 16, February. (Not *Vespertilio formosa* HODGSON.)

*Specimen*.—One, from Luzon: Malolos Bulacan (Lewis).

This specimen agrees in all details, except the number of premolars, with Tomes' account of the type-specimen of *Vespertilio rufo-pictus* Waterhouse,<sup>2</sup> which seems to require recognition as a distinct species.

<sup>1</sup> Specimens from each lot listed have been determined at the British Museum by Dr. Knud Andersen.

<sup>2</sup> Tomes, Proc. Zool. Soc. London, 1858, p. 85.



In our specimen the second upper premolar is wanting on one side, and on the other side is minute and not visible from without. The first and third lower premolars of each side are in close contact; the second premolars are crowded entirely out of the rows, and are not visible from outer sides. This probably accounts for Tomes' description of the dentition of the species as *pm* 2-2, a most natural mistake if the skull was not removed and thoroughly cleaned.

**MYOTIS MACROTARSUS** (Waterhouse).

*Specimens*.—Three, from localities as follows: Mindanao: Iligan, 2 (Grubbs); Zamboanga, 1 (Mearns).

**PIPISTRELLUS IMBRICATUS** (Horsfield).

*Specimens*.—Seven, from Luzon: Manila (Steere).

**GLISCHROPUS TYLOPUS** (Dobson).

1875. *Vesperugo (Glischropus) tylopus* DOBSON, Proc. Zool. Soc. London, p. 473.

1907. *Glischropus tylopus* MILLER, Bull. 57 U. S. Nat. Mus., p. 205, June 29.

*Specimen*.—One, from Palawan (Steere).

The single specimen is slightly smaller than any individual in a series from Borneo, the specimens of which differ greatly among themselves, however, in size. The species was heretofore known from the Philippines only by the questionable record of Casto de Elera.<sup>1</sup>

**NYCTALUS STENOPTERUS** (Dobson).

1875. *Vesperugo stenopterus* DOBSON, Proc. Zool. Soc. London, 1875, p. 470. (Sarawak, Borneo.)

*Specimen*.—One, from Mindanao: Zamboanga (Mearns).

This species has not previously been recorded from the Philippine Islands.

**TYLONYCTERIS PACHYPUS** (Temminck).

1841. *Vespertilio pachypus* TEMMINCK, Monog. de Mamm., vol. 2, p. 217.

1872. *Tylonycteris* [meyer] PETERS, Monatsb. Königl. Preuss. Akad. Wiss., p. 705. (Southern Luzon.)

*Specimens*.—Three, from the following localities:

Luzon: Montalban, 2 (Bartsch).

Palawan: 1 (Steere).

**SCOTOPHILUS TEMMINCKII** (Horsfield).

*Specimens*.—Sixty-eight, from localities as follows:

Luzon: Dingras, Ilocos Norte, 3 (Mearns); Manila, 1 (Mearns); San Fernando de Union, 16 (Lewis).

Catanduanes: Pandan, 3 (Mackie).

Ticao: 2 (P. B. S.).

Sibuyan: 1 (P. B. S.).

Panay: Guimarás, 1 (Steere).

<sup>1</sup> Catálogo Sistemático de Toda la Fauna de Filipinas, vol. 1, p. 12, Manila, 1895.

Negros: 8 (Steere).

Mindanao: Iligan, 31 (Grubb).

Palawan: Malampaya Sound, 1 (Mearns).

Philippine Islands: 1 (Mearns).

**MINIOPTERUS ESCHSCHOLTZII** (Waterhouse).

1845. *Vespertilio eschscholtzii* WATERHOUSE, Proc. Zool. Soc. London, Jan. 14 (1845), p. 3, April. (Philippine Islands.)

1912. *Miniopterus schreibersii* HOLLISTER, Philippine Journ. Sci., vol. 7, sec. D, p. 18, February. (Not *Vespertilio schreibersii* KUHLE, 1819.)

*Specimens*.—Six, from localities as follows:

Luzon: Irian, Benguet, 2 (P. B. S.); Malabon, 1 (Carpenter).

Guimarás: 2 (Steere).

Philippine Islands: 1 (Cuming).

The Philippine bats heretofore placed with *Miniopterus schreibersii* differ enough from European specimens of the latter to merit recognition as a distinct species. The skulls of the island examples are slightly larger and have conspicuously broader and heavier rostra.

**MINIOPTERUS TRISTIS** (Waterhouse).

*Specimen*.—One, from the following locality: Lubang (P. B. S.).

*Measurements of Miniopterus eschscholtzii and M. tristis.*

Species and locality.	Number.	Sex.	Forearm.	Third digit metacarpal.	Foot with claw.	Skull: Condyllobasal length.	Zygomatic breadth.	Breadth of brain case.	Mandible.	Maxillary tooth row (entire).	Mandibular tooth row (entire).
<i>M. eschscholtzii</i> :			mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Irian, Benguet, Luzon.....	48 P. B. S.	Female	43.9	38	7.6	14.2	8.4	7.6	10.8	7	7.5
Do.....	66 P. B. S.	do.....	44.3	39.5	8.4	14.2	8.4	7.6	10.5	7	7.5
Malabon, Luzon.....	144848		40.9	35.5	7.5						
Guimarás Island.....	105504		44.1	38.2	7.5						
Do.....	105507		44.3	38.2	7.2						
<i>M. tristis</i> :											
Lubang Island	21 P. B. S.	Male....	51.9	47	10.2	18.5	10.4	8.9	14.8	9.1	10.0

**MINIOPTERUS PAULULUS**, new species.

*Type*.—From Guimarás Island. Adult in alcohol, skull removed, U. S. National Museum No. 105493. Collected in December, 1887, by J. B. Steere.

*Diagnosis*.—Size very small, less than in *M. pusillus* Dobson; forearm 35 mm. to 36.4. General characters apparently as in *M. australis* Tomes, but size considerably less. Wing from some distance (1 to 2 mm.) above lower end of tibia; calcar turns from leg slightly above the starting point of wing, about one-fifth length of tibia from foot. Upper surface of interfemoral membrane to end of third caudal vertebra, and entire length of tibiæ, thinly haired. Color of hair (alcoholics) throughout uniform dark blackish-brown, without lighter underfur.

*Measurements of type*.—Forearm, 35 mm.; third metacarpal, 31; fourth metacarpal, 29.5; fifth metacarpal, 27; hind foot, 7. Forearm measurement in four topotypes ranges from 35.1 to 36.4. Skull of type: Greatest length, 13.4; condylobasal length, 12.5; zygomatic breadth, 7.0; breadth brain case, 6.6; upper tooth row, entire, 6.1; mandible, 9.4; lower tooth row, entire, 6.5.

*Specimens*.—Five, from the type locality, all in alcohol: Guimarás: 5 (Steere).

#### Family MOLOSSIDÆ.

##### CHÆREPHON LUZONUS, new species.

*Type*.—From Cagayan, Cagayan Province, northern Luzon. Adult male in alcohol, skull removed, U. S. National Museum No. 144881. Collected by Dr. Edgar A. Mearns.

*Diagnosis*.—About intermediate in size between *Chærephon plicatus* and *C. pusillus*. Much lighter colored than *plicatus*; brown above, drab and buffy below. Wing from near center of tibia.

*Color* (from alcoholic specimen).—Upperparts dark brown, close to warm sepia, the hairs drab near roots. Underparts with hairs drab at basal half, buffy at tips, giving a general color of grayish-buff; lighter, almost pure white, on throat and lower belly.

*Skull and teeth*.—Skull most like that of *C. jobensis*, but very much smaller; about intermediate in size between skulls of *jobensis* and *pusillus*. Teeth much smaller than in *jobensis* or *plicatus*.

*Measurements*.—From alcoholic type: Head and body, 54 mm.; tail, 33; hind foot, 10; forearm, 44.4. Skull of type: Greatest length, 17.6; condylobasal length, 16.2; zygomatic breadth, 10.0; mastoid breadth, 9.6; interorbital constriction, 3.1; maxillary tooth row, including canine, 6.0; mandible, 11.8; mandibular tooth row, entire, 7.0.

*Specimen*.—The type: Luzon: Cagayan, 1 (Mearns).

The Philippine records of *Chærephon plicatus* doubtless refer to the species here described.

#### Family MUSTELIDÆ.

##### MYDAUS MARCHEI Huet.

*Specimen*.—One, from Palawan: Iwahig (Mearns).

##### AONYX CINEREA (Illiger).

*Specimen*.—One, from Palawan: Iwahig (Mearns).

#### Family VIVERRIDÆ.

##### VIVERRA TANGALUNGA Gray.

*Specimens*.—Six, from localities as follows:

Luzon: Mariveles, Bataan, 1 (P. B. S.).

Lubang: 1 (P. B. S.).

Palawan: Iwahig, 1 (Mearns).

Mindanao: Catagan, 1 (Mearns); Lake Lanao, 1 (Mearns); Mount Apo, 1 (Mearns).

With a splendid series of sixty skins and skulls of *Viverra zangha* from Sumatra, Borneo, and many of the smaller Malayan islands, for comparison with the Philippine material, I am unable to find the slightest constant character to divide the species into geographical races.

**PARADOXURUS PHILIPPINENSIS** Jourdan.

*Specimens*.—Five, from the following localities:

Luzon: Nagpartian, Ilocos Norte, 2 (Mearns).

Ticao: 1 (P. B. S.).

Mindoro: Bulacao, 1 (Mearns).

Palawan: [Iwahig?], 1 (Mearns).

**PARADOXURUS MINAX** Thomas.

*Specimens*.—Five, from the following localities: Mindanao: Baganga, 1 (Mearns); Catagan, 1 (Mearns); Grand Malindang, 1 (Mearns); Mount Apo, 1 (Mearns); Zamboanga, 1 (Mearns).

The material representing this genus from the Philippines is far too little to work out the forms satisfactorily. The characters given by Thomas for his *P. minax* are mostly untrustworthy, as shown by our material, limited as it is. The Mindanao animal does not seem to differ in size or size of skull from the Luzon form. It does, however, average darker in color, so far as shown by the few available skins, and doubtless will prove to be a recognizable race.

Family CANIDÆ.

**CANIS FAMILIARIS** Linnæus.

*Specimens*.—Five skulls of the native domestic dog, from the following localities:

Luzon: Baguio, Benguet, 1 (Mearns).

Mindanao: Little Santa Cruz Island, 1 (Mearns); Sarangani Bay, 1 (Mearns); Zamboanga, 2 (Mearns).

Family SCIURIDÆ.

**NANNOSCIURUS CONCINNUS** (Thomas).

*Specimens*.—Nine, from the following localities: Basilan: "Basilan," 6 (P. B. S.); Isabela, 3 (Mearns).

**NANNOSCIURUS SURRUTILUS**, new species.

*Type*.—From summit of Mount Bliss, 5,750 feet, Mindanao. Adult female, skin and skull, U. S. National Museum No. 144641. Collected May 28, 1906, by Dr. Edgar A. Mearns. Orig. No. 6170.

*Diagnosis*.—Like *Nannosciurus concinnus*, of Basilan, but darker colored, less reddish; and with longer, more slender, skull.

*Color of type.*—General color of upperparts dark reddish-brown, finely marked with black; much darker and less reddish than in *N. concinnus*; the underfur broadly slate-black; terminal half of hairs ringed with black and ochraceous-tawny, and tipped with black. Cheeks and sides more buffy, less reddish. Underparts with underfur deep neutral-gray, the hairs tipped with buckthorn-brown. Hands and feet like back but brighter, more reddish-orange. Tail above and below mixed black and Sudan-brown, with more black at tip. "Iris hazel."

*Skull and teeth.*—Skull longer and more slender than that of *concinnus*, the nasals and rostrum narrower and the braincase elongated; audital bullæ slightly larger. Teeth as in *concinnus*.

*Measurements of type.*—Total length, 164 mm.; tail vertebræ, 77; tail to end of hairs, 113; hind foot, 25. Skull: Greatest length, 27.7; condylobasal length, 24.9; zygomatic breadth, 16.8; interorbital breadth, 10.2; maxillary tooth row, 4.2; mandible, 16.4; mandibular tooth row, 4.0.

*Specimens.*—Four, from the following localities: Mindanao: "Mindanao," 2 (Steere); Mount Malindang, 1 (Mearns); Summit of Mount Bliss, 1 (Mearns).

This new form apparently needs no special comparison with *N. samaricus*, as the coloration is widely different from that described of the Samar animal.

SCIURUS SAMARENSIS Steere.

*Specimens.*—Two, from Samar or Leyte (Steere).

SCIURUS MINDANENSIS Steere.

*Specimens.*—Three, from the following localities: Mindanao: Catagan, 1 (Mearns); Lower Rio Grande Valley, 1 (Mearns); Mount Malindang, 1 (Mearns).

SCIURUS PHILIPPINENSIS Waterhouse.

*Specimen.*—One, from Basilan (P. B. S.).

SCIURUS JUVENCUS Thomas.

*Specimens.*—Three, from the following locality: Palawan: Puerta Princesa, 3 (Mearns, P. B. S.).

Family PETAURISTIDÆ.

SCIUROPTERUS CRINITUS Hollister.

*Specimen.*—One, the type, from Basilan (P. B. S.).

## SCIUROPTERUS NIGRIPES Thomas.

*Specimens*.—Two, from localities as follows: Palawan: "Palawan," 1 (Mearns); Tinabag, 1 (P. B. S.).

The museum specimen of this species is blotched everywhere with white, and has the belly pure white, much as described of the series in the American Museum of Natural History by Dr. J. A. Allen.<sup>1</sup> The Philippine Bureau of Science skin is of the normal color, as described of the type by Thomas.

## Family MURIDÆ.

## CELÆNOMYS SILACEUS (Thomas).

*Specimen*.—One, from Luzon: Hights-in-the-oaks, Benguet (Mearns).

## CHROTOMYS WHITEHEADI Thomas.

*Specimens*.—Four, from localities as follows: Luzon: Irisan, Benguet, 1 (P. B. S.); Lepanto Province, 3 (Whitehead).

## PHLÆOMYS PALLIDUS Nehring.

*Specimens*.—Three, from localities as follows: Luzon: Hights-in-the-oaks, Benguet, 2 (Mearns); Irisan, Benguet, 1 (P. B. S.).

The Irisan and one of the Hights-in-the-oaks specimens are virtually alike in color; the other specimen from Hights-in-the-oaks lacks the black patch on the withers. Doctor Mearns records the weight of his specimens as four pounds each. A female collected August 2 contained one small fetus; mammae,  $\frac{1}{2}$  inguinal only. A specimen brought to Doctor Mearns alive ate several bodies of skinned birds in the evening and drank water freely.

*Measurements of skulls of Phlæomys pallidus from Luzon.*

Number.	Locality.	Sex.	Condylobasal length.	Zygomatic breadth.	Length of nasals.	Interorbital breadth.	Mandible.	Maxillary tooth row.	Mandibular tooth row.	Observations
151519	Hights-in-the oaks.	Female	mm. 85	mm. 46.4	mm. 34.4	mm. 16	mm. 57.3	mm. 19.8	mm. 20.2	Basal suture closed.
151520	.....do.....	.....do.....	84.5	43.4	30.5	15.8	55.9	18.9	20.4	Do.
49 P. B. S.	Irisan.....	.....	82.3	40.5	31.3	13.8	54.6	19.3	20.3	Basal suture open.

## EPIMYS EVERETTI (Günther).

*Specimens*.—Seven, from the following localities: Luzon: Baguio, 3 (Mearns); Hights-in-the-oaks, 3 (Mearns); Irisan, 1 (P. B. S.).

<sup>1</sup> Bull. Amer. Mus. Nat. Hist., vol. 28, p. 14, January 29, 1910.

## EPIMYS GALA Miller.

*Specimens*.—Three, including the type, from Mindoro: Alag River, 3 (Mearns).

## EPIMYS TAGULAYENSIS (Mearns).

*Specimens*.—Three, from the following localities:

Mindanao: Tagulaya, Gulf of Davao, 1, the type (Mearns); Upper Baganga River, 1 (Mearns).

Basilan: 1 (Steere).

The specimen from Basilan probably represents a new species, but it is too young and in too poor condition to separate it from the small series of *tagulayensis*.

## EPIMYS ALBIGULARIS (Mearns).

*Specimens*.—Fifteen, including the type, from: Mindanao: Mount Apo (Mearns).

*Measurements of rats of the Epimys everetti group.*

Species and number.	Locality.	Sex.	Head and body.	Tail vertebrae.	Hind foot with claws.	Skull: Condylar length.	Zygomatic breadth.	Mandible.	Maxillary tooth row.	Mandibular tooth row.	Observations.
<i>E. everetti</i> :			mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	
151500.....	Baguio, Luzon.	Male....	239	258	47	51.1	25.3	30.7	8.8	8.5	Young adult.
151501.....	Haight's in the oaks, Luzon.	do.....	210	240	49	47.7	22.4	29.3	8.4	8.5	Teeth moderately worn.
151503.....	do.....	do.....	192	210	47	40.3	19.8	26.3	8.9	9	Teeth little worn.
151502.....	do.....	Female..	235	265	49	49.7	23.9	31.3	9.1	9	Teeth much worn.
145792.....	Baguio, Luzon.	do.....	183	200	45	43.2	21.8	26.2	8.9	8.5	
151504.....	do.....	do.....	172	193	42	40.8	21	24.1	8.2	8.1	Teeth moderately worn.
46 P. B. S.....	Irisan, Luzon.	do.....	225	230	43	48.4	.....	.....	8.5	8.3	Teeth much worn.
<i>E. gala</i> :											
144633.....	Alag River, Mindoro.	Male....	209	241	48	48	24.8	31.2	9.6	9.4	Type.
144632.....	do.....	Female..	170	185	44	40.9	.....	26.4	9.5	9.4	Teeth little worn.
<i>E. tagulayensis</i> :											
125264.....	Tagulaya, Mindanao.	Male....	262	260	52	51.5	26.7	31.6	10	9.3	Type.
125266.....	Baganga River, Mindanao.	do.....	.....	.....	.....	52.5	27	31.8	9.3	9	Teeth considerably worn.
<i>E. albigularis</i> :											
125258.....	Mt. Apo, Mindanao.	do.....	260	236	52	51.8	25.8	32.6	10	9.8	Type.
125260.....	do.....	do.....	257	260	54	52.8	26.2	31.4	10.2	9.9	Teeth considerably worn.
125267.....	do.....	do.....	192	203	46	43.5	22.2	26.8	9.1	9.2	Teeth little worn.
125254.....	do.....	Female..	235	245	49	47.9	24.2	29.9	9.4	9.4	Teeth moderately worn.
125256.....	do.....	do.....	209	216	46	43.2	22	27	9.3	9.5	Teeth little worn.
125257.....	do.....	do.....	215	210	46	45.7	22.5	27.7	9.7	9.7	Do.
125259.....	do.....	do.....	225	225	47	47.9	24.5	28.8	9.3	9.4	Teeth moderately worn.
125261.....	do.....	do.....	231	250	49	50.6	24.8	30.7	9.3	9.3	Do.
125262.....	do.....	do.....	245	255	50	49.8	25.9	31.4	9.2	9.6	Do.
125263.....	do.....	do.....	240	248	50	50.3	25.9	31	9.3	9.3	Do.



## EPIMYS TYRANNUS Miller.

*Specimen*.—One, the type, from Ticao (P. B. S.).

## EPIMYS NORVEGICUS (Erxleben).

*Specimens*.—Thirty-seven, from localities as follows:

Luzon: Aparri, 1 (Mearns); Manila, 30 (Mearns).

Mindoro: Calapan, 2 (Mearns).

Panay: Ilo-ilo, 1 (Fox).

Mindanao: Zamboanga, 3 (Mearns).

## EPIMYS MAGNIROSTRIS (Mearns).

*Specimens*.—Two, including the type, from Mindanao: Zamboanga (Mearns).

This species proves to be an aberrant member of the *rattus* group, related to the forms on Mindanao and the adjacent islands, and to true *neglectus*. The supraorbital beads are much less rounded than is usual in species of the *rattus* group, and are in fact much as in *E. norvegicus*; but the teeth are typical of the *rattus* group.

## EPIMYS COLORATUS, new species.

*Type*.—From Musser's Plantation, 3 miles west of Isabela, Basilan Island. Adult female (teeth considerably worn), skin and skull, U. S. National Museum No. 144571. Collected February 21, 1906, by Dr. Edgar A. Mearns. Orig. No. 6044.

*Diagnosis*.—A member of the *rattus* group related to *E. magnirostris* of Zamboanga, but differing in having the underparts dark grayish-buff, and the skull smaller, short, broad, and more heavily built. Pelage harsh.

*Color*.—General color above and on sides dark russet-brown; the hairs gray at bases and mixed with numerous brown-tipped, yellowish spines, especially forward. Underparts grayish-buff, blending with color of upperparts without distinct line of demarcation. The pelage below is made up of buffy spines and softer hairs of gray. Throat and anal regions with numerous pure ochraceous hairs. Hands and feet marked with broad bands of blackish-brown, extending from color of arms and legs along upper surface to base of digits; digits pale buffy white.

*Skull and teeth*.—Skull smaller than skull of *E. magnirostris*; larger than that of *E. neglectus* of Borneo; heavier built and more arched, with relatively wider braincase; supraorbital beads especially heavy, more curved on parietals than in *magnirostris*, which has the beads almost parallel, much as in species of the *norvegicus* group. Teeth as in *magnirostris*; considerably larger than in *neglectus*.

*Measurements of type* (from well-made skin).—Head and body, 211 mm.; tail, 222; hind foot, without claw, 34. Skull: Greatest length, 42.8; condylobasal length, 41.8; palatal length, 24.2; zygomatic

breadth, 20.4; interorbital breadth, 6.6; mastoid breadth, 16.9; upper tooth row, alveoli, 8.1; mandible, 26.1; lower tooth row, 7.2.

*Specimens*.—Six, from the type locality: Basilan: Isabela (Mearns, Musser).

**EPIMYS ROBIGINOSUS, new species.**

*Type*.—From Cagayancillo, Cagayan Island. Adult male (teeth considerably worn), skin and skull, Coll. Philippine Bureau of Science No. 33. Collected February 7, 1903, by R. C. McGregor and A. Celestino.

*Diagnosis*.—A member of the *rattus* group; most like *E. coloratus* of Basilan, but with the sides, limbs, hands, and feet very much lighter, the feet buffy-white, rarely marked with a faint brownish band above. Underparts cream color, sharply marked from color of sides, the hairs unicolor or very slightly darkened with gray at bases. Skull like that of *coloratus* but with supraorbital beads much more curved on parietals, nearly pyriform; palatine foramina wide and bowed. Teeth smaller, only slightly larger than in *neglectus* from Borneo.

*Measurements of type* (from well-made skin).—Head and body, 217 mm.; tail, 187. Skull: Greatest length, 43.6; condylobasal length, 42.4; zygomatic breadth, 21.3; mastoid breadth, 16.8; interorbital breadth, 7.0; upper tooth row, 7.3; mandible, 25.1; lower tooth row, 6.3.

*Specimens*.—Twelve from the type locality, all in the collection of the Philippine Bureau of Science.

Cagayan: Cagayancillo, 12 (P. B. S.).

**EPIMYS RATTUS (Linnaeus).**

*Specimens*.—Eight, from localities as follows:

Luzon: Manila, 2 (Mearns, Fox).

Panay: Ilo-ilo, 6 (Fox).

**EPIMYS MINDANENSIS (Mearns).**

*Specimens*.—One hundred and three, from the following localities:

Luzon: Baguio, Benguet, 22 (Mearns); Laoag, Ilocos Norte, 6 (Mearns); Manila, 12 (Mearns); San Isidro, 1 (Lewis).

Catanduanes: Bagamanoc, 3 (Mackie); Baras, 1 (Mackie); Biga, 1 (Mackie); Calolbong, 2 (Mackie); Caramoran, 1 (Mackie); "Catanduanes," 2 (Mackie); Jimoto, 1 (Mackie); Pandan, 2 (Mackie).

Mindoro: Alag River, 18 (Mearns); Bulalacao, 1 (Mearns); Mount Halcon, 1 (Mearns); Mount Malindang, 2 (Mearns); San Jose, 2 (Fox).

Batan: 1 (P. B. S.).

Romblon: 1 (P. B. S.).

Masbate: 1 (P. B. S.).

Ticao: 7 (P. B. S.).

Panay: Ilo-ilo, 2 (Fox).

Negros: 2 (Steere).

Mindanao: Davao, 3 (Mearns); Margo Satúbig, 2 (Kierulff); Pantar, 4 (Mearns); Todaya, Mount Apo, 2, including the type (Mearns).

I am unable to divide this species satisfactorily into island races over all this range. In Mindanao and on some of the southern islands forms are well marked. Doubtless a large series of specimens of comparable age and pelage would make it possible to recognize races on many of the northern islands as well.

EPIMYS MINDORENSIS (Thomas).

*Specimens*.—Eleven, from Mindoro: Mount Halcon (Mearns).

On the evidence of specimens from the Alag River and lower slopes of Mount Halcon, listed under *Epimys mindanensis*, I mistrust that this handsome mountain species, distinct as it appears to be, does really intergrade with the wide ranging lowland form.

EPIMYS ZAMBOANGÆ (Mearns).

*Specimen*.—One, the type, from Mindanao: Zamboanga (Mearns).

EPIMYS KELLERI (Mearns).

*Specimen*.—One, the type, from Mindanao: Davao (Mearns).

From the fact that no specimens referable to the true *Epimys neglectus* of Borneo have been found in the material representing the *rattus* group from the Philippine Islands in the United States National Museum collections nor among the numerous specimens examined for the Philippine Bureau of Science, I believe that *E. neglectus* should be dropped from the list of Philippine mammals.

EPIMYS QUERCETI Hollister.

*Specimens*.—Two hundred and fourteen, from localities as follows: Luzon: Hights-in-the-oaks, Benguet, 56, including the type (Mearns); Manila, 158 (Mearns, Fox).

The Manila examples are not typical and have slightly smaller teeth than the series from Benguet. The Manila specimens are, however, mostly in alcohol, and without a series of skins it does not seem best to attempt the separation of a form based on so slight an average character.

EPIMYS MAYONICUS, new species.

*Type*.—From Mount Mayon, Albay Province, Luzon (4,000 feet). Male adult, skin and skull (teeth considerably worn), United States National Museum No. 144600. Collected June 5, 1907, by Dr. Edgar A. Mearns. Original No. 6438.

*Diagnosis*.—Externally like *Epimys querceti*, but slightly less in size, with more yellowish sides, hips, and underparts; pelage more spiny than in any example of *querceti* in a series of over 50 specimens, but these differ greatly among themselves in this respect. Skull differs from that of *querceti* in its much narrower, almost parallel-

sided [not spatulate] nasals, rounded, higher audital bullæ, and larger teeth.

*Measurements of type* (from dry skin).—Head and body, 117 mm.; tail vertebrae, 112; hind foot (moistened), without claws, 23.7. Skull: Greatest length, 30.6; condylobasal length, 28.6; zygomatic breadth, 14.6; breadth braincase, 13.2; interorbital breadth, 4.7; length of nasals, 11.2; upper tooth row, alveoli, 5.6; mandible, 17.2; lower tooth row, alveoli, 5.4.

*Specimen*.—One, the type, from Luzon: Mount Mayon, Albay (Mearns).

Dr. Mearns's catalogue records of the single specimen: "Caught in a patch of tall cane grass just above timber line." This form will doubtless prove to be a geographical race of *Epimys querceti*.

EPIMYS LEUCOPHÆATUS, new species.

*Type*.—From Bagamanoc, Catanduanes Island. Adult female (teeth slightly worn), skin and skull, United States National Museum No. 155144. Collected May 27, 1909, by D. B. Mackie. Original No. 5.

*Diagnosis*.—Size small; pelage very spiny. Differs from all the Philippine members of the *concolor* group in its pale grayish-brown coloration and relatively heavy skull, with massive rostrum.

*Color*.—Upperparts from head to rump dark brownish-drab, a mixture of sulphur-yellow spines with brown tips and softer hairs with dark gull-gray bases and cinnamon-buff tips. Cheeks, sides, and limbs paler, more grayish; hands and feet pale buffy-white. Underparts pale buffy-white with brighter yellowish wash on groin and at base of tail; hair of belly and chest faintly gray at base.

*Skull and teeth*.—Skull most resembling that of *E. querceti* of Luzon, but with decidedly heavier, wider, rostrum and smaller, more rounded, audital bullæ. Teeth essentially as in *querceti*.

*Measurements of type* (from well made dry skin).—Head and body, 114 mm.; tail, 112; hind foot, without claws, 24. Skull: Greatest length, 28.9; condylobasal length, 27.4; zygomatic breadth, 14.2; breadth braincase, 13.2; nasals, 10.2; breadth rostrum, 5.4; interorbital breadth, 4.9; upper tooth row, alveoli, 5.1; mandible, 16.5; lower tooth row, 5.0.

*Specimen*.—One, the type, a breeding female from Catanduanes: Bagamanoc (Mackie).

EPIMYS CALCIS Hollister.

*Specimens*.—Twenty-three, including the type, from Luzon: Baguio Benguet, 23 (Mearns).

EPIMYS NEGRINUS (Thomas).

*Specimens*.—Three, from the following localities: Negros: Canlaon Volcano, 2 (P. B. S.); "Negros," 1 (Steere).

## EPIMYS VIGORATUS, new species.

*Type*.—From Mount Halcon, Mindoro (spur of main ridge at 4,500 feet). Adult male (teeth considerably worn), skin and skull, U. S. National Museum No. 144637. Collected November 15, 1906, by Dr. Edgar A. Mearns. Orig. No. 6306.

*Diagnosis*.—Like *Epimys todayensis* of Mindanao, but larger, with decidedly longer tail and hind foot. The largest member of the *concolor-ephippium* group known from the Philippines.

*Color*.—Almost precisely as in *E. todayensis*.

*Skull and teeth*.—The skull, compared with skulls of *todayensis*, is somewhat larger; the anterior half of the skull is shortened and the braincase is elongated; the outline of the supraorbital heads and occiput, in adult skulls, is thus more ovate-pyriform than in *todayensis*. Teeth as in *todayensis*.

*Measurements of type*, compared with measurements of the largest adult male *todayensis* in the collection, the latter in parentheses: Total length, 307 (285) mm.; tail vertebrae, 166 (130); hind foot, 32 (28). Skull of type: Greatest length, 35.0; condylobasal length, 32.6; palatal length, 18.7; nasals, 12.1; interorbital breadth, 5.4; breadth of braincase, 14.4; upper tooth row, alveoli, 5.9; mandible, 19.5; lower tooth row, alveoli, 5.4.

*Specimens*.—Five, from localities as follows: Mindoro: Alag River, 1, (Mearns); Bulalacao, 2 (Mearns); Mount Halcon, 2, including the type (Mearns).

## EPIMYS TODAYENSIS (Mearns).

*Specimens*.—Sixteen, from localities as follows: Mindanao: Cagayan, 8 (Mearns); Margo Satúbig, 1 (Mearns); "Mindanao," 1 (Steere); Todaya, Mount Apo, 4, including the type (Mearns); Zamboanga, 2 (Mearns).

The material from Zamboanga District is too poor for positive determination, but apparently belongs here. It consists only of two broken skulls from hawk stomachs and one alcoholic specimen in poor condition.

## EPIMYS VULCANI (Mearns).

1905. *Mus vulcani* MEARNS, Proc. U. S. Nat. Mus., vol. 28, p. 446.

1905. *Mus vulcani apicis* MEARNS, Proc. U. S. Nat. Mus., vol. 28, p. 447.

1912. *Epimys vulcani vulcani* and *Epimys vulcani apicis* HOLLISTER, Philippine Journ. Sci., vol. 7, sec. D, p. 30, February.

*Specimens*.—Nine, including the types of *vulcani* and *apicis*, from Mindanao: Mount Apo (Mearns).

After detail study of all the species in the group, many represented by large series, the slight differences exhibited by the single specimen designated as the type of *apicis* seem too slight, and probably of too doubtful constancy, to recognize a form by name.

## EPIMYS PANTARENSIS (Mearns).

*Specimen*.—One, the type, from Mindanao: Pantar (Mearns).

## EPIMYS BASILANUS, new species.

*Type*.—From Basilan Island. Adult male (teeth slightly worn), skin and skull, U. S. National Museum No. 144635. Collected in February, 1906, by Dr. Edgar A. Mearns. Orig. No. 6039.

*Diagnosis*.—Like *Epimys todayensis* of Mindanao, but smaller, with smaller skull and teeth; underparts less buffy, more yellowish.

*Measurements of type* (from well-made dry skin).—Head and body, 130 mm.; tail, 130; hind foot, without claws, 25.5. Skull of type, compared with type skull of *E. todayensis*, measurements of latter in parentheses: Greatest length, 30.8 (34.3); condylobasal length, 28.9 (32.3); nasals, 10.9 (13.2); interorbital constriction, 4.9 (5.2); palatal length, 16.2 (18.4); upper tooth row, alveoli, 5.2 (5.8); mandible, 17.2 (19.6); lower tooth row, alveoli, 5.2 (5.9).

*Specimens*.—Four, from the following localities:

Basilan: 3 (Mearns).

Sulu: 1 (Mearns).

This rat is closely related to *E. todayensis*, of which it is only a smaller insular race. The three Basilan specimens were "trapped in the forest, away from human habitations." The Sulu specimen, an odd skull, is inseparable from the Basilan skulls, but series of skins from the two islands might show the Sulu form to be distinct.

## EPIMYS ORNATULUS, new species.

*Type*.—From Cagayancillo, Cagayan Island. Adult female (teeth slightly worn), skin and skull, Collection of Philippine Bureau of Science No. 37. Collected February 8, 1903, by R. C. McGregor and A. Celestino.

*Diagnosis*.—A small, bright-colored member of the *concolor-ephippium* group; most like *E. pantarensis* of Mindanao, but feet white, not grayish-buff, and underparts yellow, not buff. Smaller and brighter colored than *E. luteiventris* of Palawan.

*Color*.—General color of upperparts bright Sudan-brown, finely lined with blackish, made up of brown-tipped yellowish spines and of soft hairs gray at base and ringed and tipped with bright ochraceous and blackish; brighter on rump and hips. Sides lighter, yellowish-tawny; under parts straw-yellow, the hairs of middle breast and belly pale gray at bases; hands and feet thinly covered with white, or very pale cream hairs.

*Skull and teeth*.—Most like those of *Epimys pantarensis*, of same essential size but skull with longer, more slender rostrum and nasals.

*Measurements of type* (from well-made dry skin).—Head and body, 118 mm.; tail, 119; hind foot (moistened), without claws, 23.5. Skull:



Greatest length, 30; condylobasal length, 27.2; zygomatic breadth, 14.2; upper tooth row, alveoli, 5.3; mandible, 16.1; lower tooth row, 4.9.

*Specimen*.—One, the type, from: Cagayan: Cagayancillo (P. B. S.).

EPIMYS DATÆ (Meyer).

*Specimens*.—Eight, from Luzon: Hights-in-the-oaks, Benguet (Mearns).

*Measurements of Epimys datæ from Hights-in-the-oaks, Benguet Province, Luzon.*

Number.	Sex.	Head and body.	Tail vertebrae.	Hind foot with claws.	Skull: Condylobasal length.	Zygomatic breadth.	Mandible.	Maxillary tooth row.	Mandibular tooth row.	Observations.
145809.....	Male.....	mm. 162	mm. 148	mm. 36	mm. 34.2	mm. 16	mm. 21.2	mm. 6.1	mm. 6.5	Teeth little worn.
145797.....	Female..	150	175	41	37	17.5	23.3	6.7	6.5	Teeth moderately worn.
145798.....	..do.....	150	160	39	36.3	17.3	22.4	6.5	6.6	Do.
145803.....	..do.....	133	127	35	30.9	15.8	19.3	6.3	6.2	Teeth little worn.
145808.....	..do.....	128	127	36	31	15.8	18.9	6.5	6.8	Last molar not yet on level.

EPIMYS BENGUETENSIS, new species.

*Type*.—From Camp John Hay, Baguio, Benguet Province, Luzon (5,000 ft.). Adult female, skin and skull (teeth moderately worn), U. S. National Museum No. 145790. Collected May 1, 1907, by Dr. Edgar A. Mearns. Orig. No. 6405.

*Diagnosis*.—Like *Epimys datæ* but smaller and lighter colored; the underparts conspicuously different, light buff with a strong tendency toward ochraceous [in *datæ* naphthaline yellow].

*Color of type* (in worn pelage).—Upperparts mixed gray and ochraceous-buff, the hairs broadly dark gray at bases, tipped with ochraceous-buff. Cheeks and sides much lighter, almost pure warm-buff, the under fur of a lighter shade than on back. Entire underparts light buff, with a strong wash of ochraceous, the hairs very light gray at bases. Feet pinkish-buff with a faintly darker streak along upper surface; tail light brown, unicolor; whiskers dark brown and black [in *datæ* mixed with white].

*Skull and teeth*.—Except for its smaller size the skull does not differ appreciably from that of *Epimys datæ*. The last upper molars lack the antero-internal supplementary cusps, but that this is a somewhat variable character in *datæ* is shown by one specimen in which this cusp is present on one side and absent on the other.

*Measurements of type* (estimated from dry skin).—Head and body, 130 mm.; tail, 130; hind foot, without claws (moistened), 32. Skull: Condylobasal length, 33.3; zygomatic breadth, 16; interorbital



breadth, 5.3; breadth of braincase, 15.3; length of nasals, 32; upper tooth row, crowns, 6.2; mandible, 20.9; lower tooth row, 6.2.

*Specimen*.—One, the type, from Luzon: Baguio (Mearns).

The type of this new species has been compared with a series of eight skins and skulls of *Epimys datæ* collected by Doctor Mearns at Hights-in-the-oaks, northern Benguet Province. From color characters the forms seem very different, but the skulls indicate a close relationship.

**BULLIMUS BAGOBUS** Mearns.

*Specimen*.—One, the type, from Mindanao: Mount Apo (Mearns).

**BULLIMUS LUZONICUS** (Thomas).

1895. *Mus luzonicus* THOMAS, Ann. and Mag. Nat. Hist., ser. 6, vol. 16, p. 163.

1912. *Epimys luzonicus* HOLLISTER, Philippine Journ. Sci., vol. 7, sec. D, p. 29.

*Specimen*.—One, from Luzon: Hights-in-the-oaks (Mearns).

Measurements of the skull of *Bullimus luzonicus*, No. 151505, an adult female with teeth considerably worn: Greatest length, 56.4 mm.; condylobasal length, 54.4; zygomatic breadth, 26.4; palatal length, 29.6; greatest breadth of rostrum, 10; interorbital breadth, 7.7; mastoid breadth, 20.8; length of mandible, 34.2; maxillary tooth row, 10.3; mandibular tooth row, 10.3.

**LIMNOMYS SIBUANUS** Mearns.

*Specimen*.—One, the type, from Mindanao: Mount Apo (Mearns).

**LIMNOMYS MEARNSI**, new species.

*Type*.—From summit of Grand Malindang Peak (9,000 feet), Mindanao. Adult female (teeth somewhat worn), skin and skull, U. S. National Museum No. 144622. Collected June 7, 1906, by Dr. Edgar A. Mearns. Orig. No. 6190.

*Diagnosis*.—Size small; coloration much darker than in *Limnomys sibuanus*, upperparts more slate-gray, less reddish; underparts whitish, not buffy. Skull much smaller, with larger teeth.

*Color*.—Upperparts an indefinite dull grayish-brown, the pelage long and soft, deep neutral gray, tipped with dull brown; sides paler; underparts entirely whitish, the hairs unicolor. Hands thinly haired with white; feet blackish, edged with white; toes white.

*Skull and teeth*.—Skull much smaller than that of *L. sibuanus*, with relatively wider and much more rounded braincase; supraorbital beading very slight. Teeth larger, relatively wider and much more rounded, *m*<sup>1</sup> specially wider and less narrowed anteriorly.

*Measurements of type*.—Total length, 220 mm.; tail vertebræ, 133; hind foot, 27.5. Skull: Condylobasal length, 25.3; zygomatic breadth, 14.4; breadth of braincase, 14.0; interorbital constriction, 4.5; length of nasals, 9.6; upper tooth row, crowns, 5.2; mandible, 15.8; lower tooth row, 5.4.

*Specimens*.—Three, from the type-locality: Mindanao: Grand Malindang Mountain (Mearns).

**LIMNOMYS PICINUS**, new species.

*Type*.—From spur of main ridge of Mount Halcon (4,500 feet), Mindoro. Adult female (teeth moderately worn), skin and skull, U. S. National Museum No. 144605. Collected November 16, 1906, by Dr. Edgar A. Mearns. Orig. No. 6311.

*Diagnosis*.—Size medium; tail and ears short; coloration wholly different from the other known members of the group, blackish above, dusky below. Pelage long and very soft.

*Color*.—Above blackish, the head, forward part of body, and sides, finely lined with ochraceous-buff. The hairs are uniformly dark neutral gray, with narrow tips of ochraceous-buff. Scattered through the pelage of back are numerous overlying hairs of pure black, which greatly reduce the effect of the ochraceous tips on the ordinary hairs. Center of back and rump almost pure blackish; cheeks lighter, more grayish-buff. Underparts dark grayish-drab, not sharply marked from color of sides, the hairs gray at bases, tipped with drab. Hands and feet brownish-black, the digits with long yellowish-white hairs; tail brownish-black above, slightly lighter, more brownish, below.

*Skull and teeth*.—Skull smaller than that of *L. sibuanus*, larger than in *L. mearnsi*; in general shape more like that of *mearnsi*, with wide, rounded braincase and indistinct beading. Teeth slightly larger than in *mearnsi*; much larger than in *sibuanus*.

*Measurements of type*.—Total length, 205 mm.; tail vertebræ, 100; hind foot, 28. Skull: Condylbasal length, 26.7; zygomatic breadth, 14.9; breadth of braincase, 14.4; length of nasals, 10.1; upper tooth row, crowns, 5.4; mandible, 16.2.

*Specimen*.—One, the type, from Mindoro: Mount Halcon (Mearns).

This species is so different in color from the other two known forms of *Limnomys* that no direct comparison is necessary.

**TRYPHOMYS ADUSTUS** Miller.

*Specimen*.—One, the type, from Luzon: Hights-in-the-oaks (Mearns).

**MUS COMMISSARIUS** Mearns.

*Specimens*.—Sixty-five, from localities as follows:

Luzon: Manila, 55 (Mearns, Fox, U. S. Bur. Fish.); San Fernando de Union, 3 (Lewis).

Panay: Ilo-ilo, 3 (Fox).

Mindanao: Davao, 2, including the type (Mearns); Margo Satúbig, 1 (Kierulff); Zamboanga, 1 (Mearns).

The common *Mus musculus*, introduced into almost all parts of the world, continues to be unknown from the Philippine Islands.

*Measurements of skulls of Mus commissarius from the Philippine Islands.*

Locality.	Number.	Sex.	Condylodental length.	Zygomatic breadth.	Breadth of braincase.	Interorbital breadth.	Mandible.	Maxillary tooth row.	Mandibular tooth row.	Observations.
Manila, Luzon....	142980	Male....	mm. 19.2	mm. 10	mm. 9.3	mm. 3.5	mm. 10.8	mm. 3.4	mm. 2.9	Teeth little worn.
Do.....	142982	...do....	18.7	9.5	9.1	3.6	10.4	2.9	2.3	Adult, but $m^3$ and $m_3$ wanting.
Do.....	143095	...do....	18.3	10.1	9.5	3.4	10.5	3.2	2.9	Teeth little worn.
Do.....	143108	...do....	17.5	9.1	9	3.3	10.1	3.2	2.7	Do.
Do.....	143109	...do....	17.4	9.6	9.3	3.7	9.7	3.2	2.7	Do.
Do.....	143110	...do....	17.1	8.4	8.6	3.4	9.8	2.9	2.7	Teeth moderately worn.
Do.....	175764	.....	18	10.2	9.8	3.5	9.9	3.1	2.8	Teeth little worn.
Do.....	175766	.....	18.5	9.9	9.3	3.7	10.6	3.4	2.3	Adult, but $m_3$ wanting.
Do.....	175768	.....	19.4	9.7	9.3	3.7	10.9	3.3	2.6	Teeth moderately worn.
Do.....	142988	Female..	19.2	9.1	8.9	3.5	10.7	3.2	2.7	Do.
Do.....	143089	...do....	20.1	11	9.4	3.7	11.3	3.6	2.9	Teeth much worn.
San Fernando de Union, Luzon.	143883	Male....	18.3	9.8	9.1	3.5	10.4	2.9	2.7	Teeth little worn.
Do.....	143885	...do....	17.4	9.6	8.9	3.4	8.8	3	2.7	Do.
Davao, Mindanao.	125213	Female..	19	10.4	9.2	3.5	10.9	3.1	2.6	Type.
Zamboanga, Mindanao.	144920	...do....	16.1	8.9	8.4	3.5	9.2	2.7	2.6	Teeth little worn.

## TARSOMYS APOENSIS Mearns.

*Specimens.*—Five, from the following localities: Mindanao—Grand Malindang Mountain, 2 (Mearns); Mount Apo, 1, the type (Mearns); Mount Bliss, 2 (Mearns).

*Measurements of Tarsomys apensis from Mindanao.*

Locality.	Number.	Sex.	Head and body.	Tail vertebrae.	Hind foot.	Skull: Condylodental length.	Zygomatic breadth.	Mandible.	Maxillary tooth row.	Mandibular tooth row.	Observations.
Mount Apo.....	125280	Male....	mm. 135	mm. 120	mm. 32	mm. 34.5	mm. 17.4	mm. 20.9	mm. 6.1	mm. 5.9	Type. Teeth moderately worn.
Mount Bliss.....	144616	Female..	140	127	33	36.8	18.3	23.1	6.6	6.4	Teeth much worn.
Do.....	144617	...do....	118	115	31.5	.....	.....	19.5	6.2	6.1	Teeth considerably worn.
Grand Malindang Mountain.	144618	...do....	136	134	32	.....	.....	21.7	6.4	6.5	Teeth much worn.
Do.....	144619	...do....	142	138	32.5	36	18.4	22.3	6.2	6.1	Do.

## BATOMYS DENTATUS Miller.

*Specimen.*—One, the type, from Luzon: Hights-in-the-oaks (Mearns).

## CARPOMYS MELANURUS Thomas.

*Specimens.*—Three, from Luzon: "Northern Luzon" (Whitehead).

## CRATEROMYS SCHADENBERGI (Meyer).

*Specimens.*—Five, from the following localities: Luzon, Baguio, 1 (P. B. S.); "Northern Luzon," 4 (Whitehead).

*Measurements of adult skulls of Crateromys schadenbergi.*

Locality.	Num-ber.	Sex.	Condylobasal length.	Zygomatic breadth.	Interorbital breadth.	Length of nasals.	Mastoid breadth.	Palatal length.	Mandible.	Maxillary tooth row.	Mandibular tooth row.
Baguio, Benguet. ....	44	Male....	mm. 65.7	mm. 36.7	mm. 8.1	mm. 25.7	mm. 22.2	mm. 34.8	mm. 43.5	mm. 15.9	mm. 16.2
"Northern Luzon".....	P.B.S. 102546	...do....	67.1	36.6	8.1	26.8	22.6	36.8	44.8	16.5	17.7
Do.....	102544	Female..	67.8	37.7	8.2	26.4	22.2	37.7	45.5	17.8	17.9
Do.....	102545	...do....	65.1	35.4	7.4	26.8	21.1	35	42.9	15	15.8
Do.....	102554	...do....	67.5	.....	7.9	27.8	22.8	36.4	43.2	16.3	16.2

## APOMYS HYLOCETES Mearns.

*Specimens.*—Nine, including the type, from Mindanao: Mount Apo (Mearns).

## APOMYS PETRÆUS Mearns.

*Specimens.*—Two, including the type, from Mindanao: Mount Apo (Mearns).

## APOMYS INSIGNIS INSIGNIS Mearns.

*Specimens.*—Twelve, including the type, from Mindanao: Mount Apo (Mearns).

## APOMYS INSIGNIS BARDUS Miller.

*Specimens.*—Twenty-five, from localities as follows: Mindanao: Catagan, 1 (Mearns); Mount Bliss, 12, including the type (Mearns); Mount Lebo, 3 (Mearns); Mount Malindang, 9 (Mearns).

This form is a slightly characterized geographical race of *Apomys insignis*. The only distinguishing character is the slightly narrower skull, an average difference.

## APOMYS MICRODON, new species.

*Type.*—From Biga, Catanduanes Island. Adult male, skin and skull (teeth little worn), U. S. National Museum No. 155145. Collected May 8, 1909, by D. B. Mackie. Orig. No. 6.

*Diagnosis.*—Of medium size, slightly smaller than the Mindanao forms; thus widely different from either of the two known northern species, from Benguet Province, Luzon. Differs from all other forms of *Apomys* in the relatively small size of teeth.

*Color of type* (in worn pelage).—Upperparts dark cinnamon-brown; sides lighter, almost tawny-olive; underparts buffy-gray, strongly washed with pale cinnamon. Hands, feet, and tail brown, the tail apparently unicolor.

*Skull and teeth.*—The skull of the single specimen is broken in the posterior parts, but it is apparently much as in *Apomys insignis* from Mindanao in general shape; the teeth are much less in size, smaller than in any species of *Apomys* except the little *Apomys musculus* of Luzon.

*Measurements of type*, (from well-made dry skin).—Head and body, 106 mm.; tail, 135; hind foot, without claws, 25.5. Skull: Palatal length, 16.1; interorbital breadth, 4.8; upper tooth row, alveoli, 5.3; mandible, 15.5; lower tooth row, alveoli, 4.9.

*Specimen*.—One, the type, from Catanduanes: Biga (Mackie).

APOMYS MAJOR Miller.

*Specimens*.—Five, including the type, from Luzon: Hights-in-the-oaks (Mearns).

APOMYS MUSCULUS Miller.

*Specimens*.—Two, including the type, from Luzon: Baguio (Mearns).

Family LEMURIDÆ.

NYCTICEBUS PHILIPPINUS Cabrera.

1908. *Nycticebus philippinus* CABRERA, Bol. Real. Soc. Esp. Hist. Nat., vol. 8, p. 137.

*Specimen*.—One, from Mindanao: Catagan (Schroder).

The discovery of a specimen of the slow lemur in the collection from Mindanao is of very great interest. The specimen is preserved in alcohol and is too young to show if the characters described of the type by Cabrera are constant. It seems best, however, to recognize the Mindanao form, as further collecting will almost surely prove the species distinct from the Tawi Tawi form, *N. menagensis*. Cabrera's name was proposed chiefly to replace *menagensis*, supposed at the time to be without standing in nomenclature, but now becomes available for the Mindanao slow lemur.

Family TARSIIDÆ.

TARSIVS FRATERCULUS Miller.

*Specimens*.—Two, including the type, from Bohol: Sevilla (P. B. S.).

TARSIVS CARBONARIUS Heude.

*Specimens*.—Four, from the following localities: Mindanao: Catagan, 1 (Mearns); "Mindanao," 1 (Steere); Zamboanga, 2 (Mearns).

Family LASIOPYGIDÆ.

PITHECUS SYRICHTA Linnæus.

*Specimens*.—Sixteen, from localities as follows: Luzon: Batangas, 4 (Govt. Board, Pan-Amer. Exp.); Nagpartian, Ilocos Norte, 12 (Mearns).

PITHECUS MINDORUS, new species.

*Type*.—From Alag River, Mindoro. Adult male, skin and skull, U. S. National Museum No. 144674. Collected in November, 1906, by Dr. Edgar A. Mearns. Orig. No. 6301.

*Diagnosis*.—Size large, coloration dark; externally resembling *Pithecus syrichta* of Luzon, but darker and richer colored; skull much like that of *P. mindanensis* of Mindanao and Basilan, but larger.

*Color*.—General color of upperparts a dark, rich russet-brown, most intense on head and shoulders; the hairs long and coarse, deep mouse-gray at bases and marked on terminal half with alternate rings of black and rich ochraceous-tawny; usual black markings on head; sides and hips lighter than back, with less black and more yellow. Outer sides of arms and legs mixed gray and ochraceous-tawny, becoming duller, almost old-gold near wrists and ankles; hands and feet grayish-buff. Underparts, including inner sides of limbs, dirty buffy-gray. Tail blackish above near base, becoming dark gray at end; below dark buffy-gray. "Iris yellowish-brown; bare space above eye grayish-white; bare skin of muzzle light brown; feet olive-plumbeous; claws plumbeous-black; scrotum brownish-flesh color."

*Skull and teeth*.—The skull differs greatly in general shape from that of the Luzon macaque (which is long and comparatively narrow with a deep and narrow palate). It is shaped almost exactly like that of the Mindanao species, broad and rounded, with wide and heavy rostrum and wide, shallow palate; but it is decidedly larger, with a much heavier mandible. The teeth show the small supplementary, middle inner cusps on the molars, as usual in *mindanensis*. These cusps are, apparently, not normally present in *syrichta*.

*Measurements of type*.—Total length, 1,100 mm.; tail, 580; hind foot, 140; girth of chest, 390. Skull: Greatest length, 136; condylo-basal length, 112; zygomatic breadth, 84.9; front of orbit to tip of premaxillary, 54.8; breadth of rostrum above canine, 36.9; breadth of braincase above roots of zygomatics, 62.9; palatal length, 57.8; postpalatal length, 45; upper molar-premolar series, 32.9; mandible, 102; mandibular molar-premolar series, 42.2.

*Specimens*.—Three, from the following localities: Mindoro: Alag River, 1, the type (Mearns); Bulalacao, 1 (Porter); Mount Halcon, 1 (Mearns).

While differing specifically from the Luzon and the Mindanao species, the Mindoro macaque exhibits a curious combination of the distinguishing characteristics of both.

PITHECUS MINDANENSIS (Mearns).

1905. *Cynomolgus mindanensis* MEARNS, Proc. U. S. Nat. Mus., vol. 28, p. 428.

1905. *Cynomolgus mindanensis apoensis* MEARNS, Proc. U. S. Nat. Mus., vol. 28, p. 429.

1912. *Pithecus mindanensis mindanensis* and *Pithecus mindanensis apoensis* HOLLISTER, Philippine Journ. Sci., vol. 7, ser. D, p. 37.

*Specimens*.—Thirty-seven, from following localities:

Mindanao: Catagan, 9 (Mearns); Lake Lanao, 2 (Mearns); Mount Apo, 5, including type of "*apoensis*" (Mearns); Pantar, 10, including the type (Mearns); Sutug River, Gulf of Davao, 1 (Mearns); Tangob, 2 (Mearns); Zamboanga, 3 (Mearns).

Basilan: "Basilan," 1 (P. B. S.); Isabela, 3 (Mearns).

Balut: 1 (Mearns).



In the light of the abundant material collected by Doctor Mearns on his second expedition in Mindanao, it seems impossible to recognize a subspecies, *apoensis*, from the island.

PITHECUS CAGAYANUS (Mearns).

*Specimen*.—One, the type, from Cagayan Sulu (Mearns).

PITHECUS SULUENSIS (Mearns).

*Specimen*.—One, the type, from Sulu: Crater Lake Mountain (Mearns).

In the following table of measurements no skulls are listed which are not fully adult, with all the permanent teeth in place.

*Cranial and dental measurements of adult Philippine macaques.*

Species and locality.	Number.	Sex.	Greatest length.	Zygomatic breadth.	Palatal length.	Breadth of brain-case.	Front of orbit to tips of premaxillae.	Width of palate at <i>mm.</i>	Length of mandible.	Maxillary molar-premolar row.	Mandibular molar-premolar row.
<i>Pithecus syrichta</i> .											
Nagpartian, Luzon.....	144677	Male.....	125	74.8	52.8	58.7	49.7	17.2	89.3	32.6	39.8
Do.....	144678	Do.....	134.5	82.5	55.1	59.8	53.9	18.3	97.5	32.3	41.1
Do.....	144680	Do.....	140.5	.....	57.8	61.6	54	15.9	103.5	33.5	42.7
Do.....	144679	Female.....	101.5	69.2	43.8	56.4	38.3	16.8	79.8	31.7	35.6
Do.....	144681	Do.....	104	70	46.8	57.4	42.8	15.1	81.6	31.2	35.2
Do.....	144683	Do.....	105	67.8	45	55.8	39.7	17.2	81	30.4	34.2
Do.....	144684	Do.....	115.5	69.8	46.8	55.9	43.8	14	83.8	32.6	36.9
Do.....	144685	Do.....	111	67.4	45.5	55.8	40	15.4	76.7	30.7	34.7
Batangas, Luzon.....	144684	Do.....	110	69.5	43.8	56.8	41.8	17.2	80.3	30.2	34.4
Do.....	144141	Do.....	110	66	42.9	55.9	38.2	15.9	75.6	30.6	36
<i>Pithecus mindorus</i> .											
Alag River, Mindoro.....	144674	Male.....	136	84.9	57.8	62.9	54.8	20.2	102	32.9	42.2
<i>Pithecus mindanensis</i> .											
Catagan, Mindanao.....	144671	Male.....	122	83.8	53.3	56.9	49.6	16.5	93.9	31.2	40.7
Do.....	144672	Do.....	127.5	82.4	55.7	56.9	50.4	15.3	92.9	31.4	40.2
Do.....	144694	Do.....	129	83.4	53.3	59.1	50.2	16.6	97.2	31.9	39.4
Do.....	144697	Do.....	122.5	82.7	50.7	58.6	48.2	17.4	92.4	30	37.3
Lake Lanao, Mindanao.....	151661	Do.....	121	80.4	51.3	58.2	47.4	16.8	88.4	29.6	36.9
Do.....	151662	Do.....	123	81.1	50.9	58.9	48.3	16.6	87.7	30.4	39.7
Pantar, Mindanao.....	123448	Do.....	120.5	81.8	51.7	60.3	45.7	16.2	88.3	32.3	42.2
Do.....	123450*	Do.....	122.2	82.4	54.2	58.3	50.9	16.8	99.7	30.3	35.7
Do.....	123453	Do.....	122	78	49.4	58.4	45.4	17.4	89.5	30.9	39.4
Do.....	123456	Do.....	122.5	83	50.3	60	47.5	18.3	91.1	33.8	42.2
Tangob, Mindanao.....	144669	Do.....	128.7	.....	56.6	60.1	55.8	18.2	98.3	32.3	41.3
Isabela, Basilan.....	144665	Do.....	114.5	79.8	44.7	57.8	42.5	18.4	85.5	29.4	37.3
Do.....	144666	Do.....	120	81.5	49	56.2	44.8	16.4	90.3	30	39.1
Catagan, Mindanao.....	144673	Female.....	101.9	67.6	38.9	56.1	33.3	15.6	72.1	28.7	33
Do.....	144692	Do.....	102.6	67.2	41.4	55.1	37	17.1	76.9	29.4	35.7
Do.....	144695	Do.....	96.4	65.7	37.2	52.8	31.8	16	72.9	29.5	34.5
Pantar, Mindanao.....	123449	Do.....	105.5	67.7	42.2	54.7	38.8	16.7	78	29.6	33.7
Do.....	123455	Do.....	110	55.3	44.7	55.3	40.8	16.2	81.1	29.4	36.4
Mount Apo, Mindanao.....	125321	Do.....	107	71.6	39.6	56.7	34.7	15.2	77.3	29	34.3
Do.....	125322	Do.....	.....	70.2	41.8	.....	37	15	78.8	29.4	34.2
Zamboanga, Mindanao.....	144698	Do.....	94	64.5	36.1	51.9	31.3	15.8	70.2	26.7	32
Tangob, Mindanao.....	144670	Do.....	108	68.8	41.4	53.6	35.9	15.3	75.8	28.4	34.8
Balut Island.....	144664	Do.....	99	.....	38.9	52.3	34.4	14.5	73.1	28	34.1
<i>Pithecus cagayanus</i> .											
Cagayan Sulu.....	125325*	Male.....	110	77.6	45.4	55.9	43.2	16.2	82.3	29.6	37.8
<i>Pithecus suluensis</i> .											
Crater Lake Mtn., Sulu.....	125324*	Male.....	125	89.6	51	58.1	46.7	17.7	93	30.1	37

\*Type.

†Type of *Cynomolgus mindanensis apoensis*.



## Family SUIDÆ.

## SUS PHILIPPENSIS Nehring.

*Specimen*.—One, from Luzon: Casiguran (Mearns).

## SUS INCONSTANS Heude.

*Specimen*.—One, from Mindanao: Catagan (Mearns).

## SUS CALAMIANENSIS Heude.

*Specimen*.—One, from Culion (Lamson-Scribner).

## SUS DOMESTICUS Erxleben.

*Specimens*.—Three, from the following localities: Luzon: Haight-in-the-oaks, 1 (Mearns); Laoag, 1 (Mearns).

Mindanao: Zamboanga, 1 (Mearns).

## Family CERVIDÆ.

## RUSA PHILIPPINUS (Smith).

*Specimens*.—Five, from the following localities: Luzon: Abra Province, 1 (Chase); Ilocos Sur Province, 3 (Govt. Board Pan-Am. Exp.); Manila, 1 (Mearns).

## RUSA BARANDANUS (Heude).

1888. *Ussa barandanus* HEUDE, Mem. Hist. Nat. Emp. Chinois, vol. 2, pt. 1, p. 22.

*Specimens*.—Seven, from Mindoro (Le Hardy).

## RUSA FRANCIANUS (Heude).

1888. *Ussa francianus* HEUDE, Mem. Hist. Nat. Emp. Chinois, vol. 2, pt. 1, p. 24.

*Specimens*.—Twenty-three, from localities as follows: Mindanao: Catagan, 10 (Mearns); Grand Malindang Mountain, 1 (Mearns); Lanao, 4<sup>1</sup> (collector unknown); "Mindanao," 1<sup>1</sup> (Kelly); Pantar, 1 (Mearns); Santa Maria, 1 (Mearns); Zamboanga, 5<sup>1</sup> (Mearns).

There are apparently two forms of deer represented in the above series, or the variation in the size of the teeth in the common Mindanao *Rusa* is much greater than is usual in animals of this family. Without more material from other parts of the island, and especially topotypes of *francianus*, from Matai, Gulf of Davao, it seems undesirable to attempt to divide the species into local races.

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<sup>1</sup> Frontals and antlers only.

Measurements of adult skulls of *Rusa barandanus* and *R. francianus*.

Species and locality.	Number.	Sex.	Greatest length.	Greatest breadth.	Greatest length of nasals.	Greatest breadth of nasals.	Palatal length.	Maxillary molar row.	Maxillary toothrow.	Observations.
<i>R. barandanus</i> :			mm.	mm.	mm.	mm.	mm.	mm.	mm.	
Mindoro.....	144463	Male....	245	108	78.7	34.1	135	40.1	67.4	Teeth considerably worn.
Do.....	144464	...do....	268	117	96.7	36.4	150	44.8	73.1	Do.
Do.....	144465	...do....	270	110	95.9	36.3	147	45.6	76.1	Teeth moderately worn.
Do.....	144466	...do....	268	115.5	98.2	34.5	145	44.3	75.7	Teeth considerably worn.
<i>R. francianus</i> :										
Catagan, Mindanao.....	144706	...do....	262	110	87.8	42.9	157	48.3	80.8	Teeth moderately worn.
Do.....	144701	Female..	264.5	104	90.9	41	150	52.5	88	Do.

## RUSA BASILANENSIS (Heude).

1888. *Melanaxis basilanensis* HEUDE, Mem. Hist. Nat. Emp. Chinois, vol. 2, pt. 1, p. 49.

*Specimen*.—One pair of antlers with frontals from Basilan: Isabela (Mearns).

There are evidently two species of deer on Basilan. One, *Rusa nigricans* (*Cervus steerii* Elliot), is fairly well known. It is a much smaller species than is represented by the frontals and antlers collected by Doctor Mearns at Isabela. The species described by Heude was based on a mutilated skull, which was doubtfully supposed to represent a species related to *R. alfredi* of the more northern islands. From the excellent figure of this skull and the antlers, I judge Doctor Mearns's specimen to be the same. If this is so, the species is a member of the group of larger Philippine deer, including *philippinus* of Luzon and *francianus* of Mindanao.

## RUSA NIGELLUS, new species.

*Type*.—From Mount Malindang at 8,000 feet, Mindanao. Skin and skull of adult male (permanent teeth in place, but little worn), Cat. No. 144711, U.S.N.M. Collected May 30, 1906, by Dr. Edgar A. Mearns. Orig. No. 6193.

*Diagnosis*.—A small deer apparently related to *Rusa nigricans*, but with prominent facial markings, smaller skull, and much smaller teeth. Very much less in size than the common deer of Mindanao, *Rusa francianus*.

*Color of type*.—Face brownish-black, marked by two transverse bands of golden-brown, the first over muzzle 10 mm. above nose pad; the second across forehead, bowing to each horn. Lower lip whitish; chin blackish; throat dark brown with median longitudinal stripe of pale cinnamon. Nape and back of ears black; lining of ears buffy-white. Neck and body dark blackish-brown, the mummy-brown of

Ridgway, 1912, mixed with numerous blackish hairs; middle belly darker, more blackish; pectoral and inguinal regions ochraceous-buff, sharply marked from general color of middle underparts, legs, and sides. Outer sides of fore legs blackish; a narrow stripe of bright ochraceous down inner side to hoofs. Hind legs blackish above, with a narrow blackish stripe in front extending down to near hoofs; a wide area of ochraceous on back side from region of knee to the lateral hoof.

*Skull and teeth*.—Skull apparently much as in *R. nigricans*, but smaller, the adult male skull slightly smaller than the female of *nigricans*. Antler pedicles very long; even longer than usual in this group of small Rusine deer. Teeth much smaller than in *nigricans*. The antlers of the type are small, with very short brow tines. A shed antler from Grand Malindang Mountain, apparently of this species, is much the same. It is 115 mm. long from the burr, without fork, and with a short brow tine of only 21 mm. length on upper surface.

*Measurements of type* (from skin).—Head and body, 1,000 mm.; tail, 80; ear, moistened, 80. Skull: Total length, estimated, 214; zygomatic breadth, 92.5; palatal length, 124; length of median frontal suture, 78; greatest length of nasals, 67; greatest width of nasals, 34.5; least width of nasals, 13.8; anterior point of nasals to end of premaxillæ, 29.5; orbit to end of premaxillæ, 108.5; length of horn pedicle from orbit, 72.5; upper molar-premolar row, 66; upper molar row, 41; upper premolar row, 27.5; greatest width  $m^2$ , 13.6; lower molar-premolar row, 72.

*Specimens*.—Two, from localities as follows: Mindanao: Grand Malindang Mountain, 1<sup>1</sup> (Mearns); Mount Malindang, 1 (Mearns).

### Family BOVIDÆ.

#### BUBALUS BUBALIS (Linnæus).

*Specimens*.—Four, from localities as follows:

Luzon: "Northern Luzon," 2 (McCoy and Babbitt).

Philippine Islands: 2 (Govt. Board Pan-Am. Exp.).

#### BUBALUS MINDORENSIS Heude.

*Specimens*.—Three, from Mindoro (Le Hardy, Merritt).

### Family EQUIDÆ.

#### EQUUS CABALLUS Linnæus.

*Specimen*.—One skull of the native domestic pony from Luzon: Laoag, Ilocos Norte (Mearns).

<sup>1</sup> Antler only.

## APPENDIX.

About 50 species of mammals, currently recognized from the Philippine fauna, are still wanting in the collection of the United States National Museum. Certain other wide-ranging species, known to inhabit the archipelago, are not represented by specimens from the Philippine Islands. Examples of all these forms, listed below, are greatly desired.

## Family SORICIDÆ.

CROCIDURA EDWARDSIANA Trouessart.

*Type-locality*.—Sulu.

## Family TUPAIIDÆ.

TUPAIA PALAWANENSIS Thomas.

*Type-locality*.—Palawan.

TAPAIA MOLLENDORFFI Matschie.

*Type-locality*.—Culion.

TUPAIA CUYONIS Miller.

*Type-locality*.—Cuyo.

## Family PTEROPIDÆ.

CYNOPTERUS BRACHYOTIS BRACHYOTIS (Müller).

1838. *Pachysoma brachyotis* MÜLLER, Tijds. Nat. Gesch., vol. 5, pt. 1, p. 146.

1862. *Pachysoma luzoniense* PETERS, Monatsb. Königl. Preuss. Akad. (1861), p. 708. (East slope of Volcano Yriga, Camarines, Luzon).

1912. *Cynopterus luzoniensis* HOLLISTER, Philippine Journ. Sci., vol. 7, sec. D, No. 1, p. 8. February.

1912. *Cynopterus brachyotis brachyotis* ANDERSEN, Cat. Chiroptera Brit. Mus., vol. 1, p. 614.

*Type-locality*.—Dewei River, Borneo. Recorded from Luzon and Mindanao.<sup>1</sup>

THOOPTERUS NIGRESCENS (Gray).

*Type-locality*.—Morty Island, Malay Archipelago. Recorded from Luzon.

PTENOCHIRUS JAGORII (Peters).

*Type-locality*.—Daraga, Albay, Luzon. Recorded also from Mindoro and from Mindanao.

<sup>1</sup> Andersen, Cat. Chiroptera Brit. Mus., vol. 1, p. 618.

## PTEROPUS LEUCOPTERUS Temminck.

*Type-locality*.—"Philippine Islands." Known only from Luzon.<sup>1</sup>

## PTEROPUS MIMUS Andersen.

1908. *Pteropus mimus* ANDERSEN, Ann. and Mag. Nat. Hist., ser. 8, vol. 11, p. 364. October.

*Type-locality*.—Macassar, Celebes. Recorded from Luzon.<sup>2</sup>

## HARPYIONYCTERIS WHITEHEADI Thomas.

*Type-locality*.—Mindoro. The type, in the British Museum, is the only specimen known.

## Family RHINOLOPHIDÆ.

## RHINOLOPHUS ANDERSENI Cabrera.

*Type-locality*.—Philippines (probably Luzon).

## RHINOLOPHUS PHILIPPINENSIS Waterhouse.

*Type-locality*.—Luzon. Recorded also from Mindanao.

## RHINOLOPHUS RUFUS Eydoux and Gervais.

*Type-locality*.—Manila, Luzon.

## Family HIPPOSIDERIDÆ.

## HIPPOSIDEROS BICOLOR (Temminck).

*Type-locality*.—Java, Amboina, and Timor. Has been recorded from Luzon and Palawan.

## HIPPOSIDEROS CORONATUS (Peters).

*Type-locality*.—Mainit, Mindanao.

## HIPPOSIDEROS OBSCURUS (Peters).

*Type-locality*.—Paracali, Luzon. Known also in Dinagat, and reported from Mindanao.

## Family VESPERTILIONIDÆ.

## PIPISTRELLUS IRRETITUS (Cantor).

*Type-locality*.—Chusan Island, China. Known from the Philippine Islands.

## PIPISTRELLUS TENUIS (Temminck).

*Type-locality*.—Java and Sumatra. Has been recorded in Mindanao.

## MINIOPTERUS AUSTRALIS Tomes.

*Type-locality*.—Australia. Recorded from Luzon.

<sup>1</sup> Andersen, Cat. Chiroptera Brit. Mus., vol. 1, p. 313, 1912.

<sup>2</sup> Andersen, Cat. Chiroptera Brit. Mus., vol. 1, p. 133, 1912.

## MINIOPTERUS PUSILLUS Dobson.

*Type-locality*.—India or Philippine Islands. Recorded from Luzon and Mindanao.

## MINIOPTERUS TIBIALIS (Tomes).

*Type-locality*.—Amboyna. Recorded from Luzon.

## MURINA CYCLOTIS Dobson.

*Type-locality*.—Darjeeling, Northeast Bengal. Has been recorded from Mindanao.

## KERIVOULA HARDWICKII (Horsfield).

*Type-locality*.—Java. Has been recorded in Mindanao and in Samar.

## KERIVOULA JAGORII (Peters).

*Type-locality*.—Samar.

## KERIVOULA PELLUCIDA (Waterhouse).

*Type-locality*.—Philippine Islands.

## KERIVOULA WHITEHEADI Thomas.

*Type-locality*.—Isabela, Northeast Luzon.

## Family MUSTELIDÆ.

## MYDAUS SCHADENBERGII Jentink.

*Type-locality*.—Calamianes Islands.

## Family VIVERRIDÆ.

## PARADOXURUS TORVUS Thomas.

*Type-locality*.—Bongao, Tawi Tawi Group.

## ARCTICTIS WHITEI Allen.

*Type-locality*.—Iwahig, Palawan.

## MUNGOS PALAWANUS Allen.

*Type-locality*.—Iwahig, Palawan.

## MUNGOS PARVUS (Jentink).

*Type-locality*.—Calamianes Islands.

## Family FELIDÆ.

## FELIS MINUTA Temminck.

*Type-locality*.—Java. Known to occur on Calamianes, Cebu, Negros, Palawan, and Panay.

## Family SCIURIDÆ.

## NANNOSCIURUS SAMARICUS Thomas.

*Type-locality*.—Samar.

## SCIURUS ALBICAUDA Matschie.

*Type-locality*.—Culion.

## SCIURUS MÖLLENDORFFI Matschie.

*Type-locality*.—Culion.

## SCIURUS PHILIPPINENSIS Waterhouse.

*Type-locality*.—Mindanao. Known also from Basilan.

## SCIURUS STEERII Günther.

*Type-locality*.—Balabac.

## Family PETAURISTIDÆ.

## SCIUROPTERUS CRINITUS Hollister.

*Type-locality*.—Basilan.

## Family MURIDÆ.

## CRUNOMYS FALLAX Thomas.

*Type-locality*.—Isabela, Luzon.

## CRUNOMYS MELANIUS Thomas.

*Type-locality*.—Mount Apo, Mindanao.

## RHYNCHOMYS SORICOIDES Thomas.

*Type-locality*.—Highlands of northern Luzon.

## PHLEOMYS CUMINGI (Waterhouse).

*Type-locality*.—Luzon. Recorded also from Marinduque and Mindoro.

## PHLEOMYS ELEGANS (Cabrera).

1901. *Capromys elegans* CABRERA, Bol. Soc. Españ. Hist. Nat., p. 372. December.

1912. *Phleomys elegans* CABRERA, Trab. Mus. Cien. Nat., No. 3, p. 30.

*Type-locality*.—Philippine Islands.<sup>1</sup>

## EPIMYS LUTEIVENTRIS (Allen).

*Type-locality*.—Iwahig, Palawan.

## EPIMYS TYRANNUS Miller.

*Type-locality*.—Ticao Island.

## MUS CASTANEUS Waterhouse.

*Type-locality*.—Philippine Islands.

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<sup>1</sup> Cabrera, Trab. Mus. Cien. Nat., No. 3, 1912, p. 30.



## BATOMYS GRANTII Thomas.

*Type-locality*.—Highlands of northern Luzon.

## CARPOMYS PHÆURUS Thomas.

*Type-locality*.—Highlands of northern Luzon.

## Family HYSTRICIDÆ.

## THECURUS PUMILUS (Günther).

*Type-locality*.—Puerto Princesa, Palawan. Known also from Balabac and from Calamianes.

## Family MANIDÆ.

## MANIS JAVANICA Desmarest.

*Type-locality*.—Java. Known from Palawan, and has been recorded on Culion.

## Family LEMURIDÆ.

## NYCTICEBUS MENAGENSIS (Lydekker).

*Type-locality*.—Bongao and Tawi Tawi.

## Family TARSIIDÆ.

## TARSIVS FRATERCULUS Miller.

*Type-locality*.—Sevilla, Bohol.

## TARSIVS PHILIPPENSIS Meyer.

*Type-locality*.—Samar.<sup>1</sup>

## Family HYLOBATIDÆ.

## HYLOBATES FUNEREUS Geoffroy.

*Type-locality*.—Sulu.

## Family SUIDÆ.

## SUS AHCENOBARBUS Huet.

*Type-locality*.—Palawan.

## SUS BARBATUS BALABACENSIS Major.

*Type-locality*.—Balabac Island.

## SUS BARBATUS PALAVENSIS Nehring.

*Type-locality*.—Puerto Princesa, Palawan.

## SUS CEBIFRONS (Heude).

*Type-locality*.—Masbate. Recorded also from Cebu.

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<sup>1</sup> Elliot, Rev. Primates, vol. 1, p. 10, 1913.

## SUS MINUTUS Heude.

*Type-locality*.—La Laguna to Tarlac, Luzon.

## Family TRAGULIDÆ.

## TRAGULUS NIGRICANS Thomas.

*Type-locality*.—Balabac.

## Family CERVIDÆ.

## RUSA ALFREDI (Sclater).

*Type-locality*.—Philippines (received from Manila). Recorded from Cebu, Guimará, Leyte, Masbate, Negros, Panay, and Samar.

## RUSA CALAMIANENSIS (Heude).

1888. *Hyelaphus calamianensis* HEUDE, Mem. Hist. Nat. Emp. Chinois, vol. 2, pt. 1, p. 49.

1897. *Cervus culionensis* ELLIOT, Field Mus. Pub. Zool., vol. 1, No. 7 (not paged), June. (Culion.)

1912. *Rusa culionensis* HOLLISTER, Philippine Journ. Sci., vol. 7, sec. D, No. 1, p. 40.

*Type-locality*.—Calamian, Philippine Islands.

## RUSA NIGRICANS (Brooke).

1877. *Cervus nigricans* BROOKE, Proc. Zool. Soc. London (1877), pt. 1, p. 57, June 1.

1896. *Cervus steerii* ELLIOT, Field Col. Mus. Pub. Zool., vol. 1, No. 3, p. 72, May. (Basilan.)

1912. *Rusa nigricans* and *Rusa steerii* HOLLISTER, Philippine Journ. Sci., vol. 7, sec. D, p. 40. February.

*Type-locality*.—Philippines. Known only from Basilan.

The status of none of the following deer, described by P. M. Heude in the Mémoires concernant l'Histoire Naturelle de l'Empire Chinois, has ever been determined, because of lack of material. Good series of specimens, particularly skulls with perfect sets of teeth, from all the type localities will be necessary before these names can properly be dealt with.

*Ussa ambrosianus*. Nueva Ecija, Luzon.

*Ussa atheneensis*. Luzon.

*Ussa baryceros*. La Laguna and Batangas, Luzon.

*Ussa brachyceros*. Batangas, Luzon.

*Melanaxis breviceps*. Masbate Island.

*Ussa chrysotrichos*. La Laguna and Batangas, Luzon.

*Ussa cinereus*. Cebu Island.

*Ussa corteanus*. Mariveles, Luzon.

*Ussa crassicornis*. Cebu.

- Ussa dailliardianus*. Jala-Jala, Laguna, Luzon.  
*Melanaxis* (?) *elegans*. Philippine Islands.  
*Ussa elorzanus*. Bataan Province, Luzon.  
*Ussa garcianus*. Nueva Ecija, Luzon.  
*Ussa gonzalinus*. Philippines, probably Luzon.  
*Ussa gorrichanus*. Batangas, Luzon.  
*Ussa guevaranus*. Marikina, Luzon.  
*Ussa guidoteanus*. Batangas, Luzon.  
*Ussa hipolitianus*. La Laguna and Batangas, Luzon.  
*Ussa longicuspis*. Probably Luzon.  
*Ussa macarianus*. Nueva Ecija, Luzon.  
*Ussa maraisianus*. Jala-Jala, Laguna de Bay, Luzon.  
*Ussa marzaninus*. Nueva Ecija and La Laguna, Luzon.  
*Melanaxis masbatensis*. Masbate Island.  
*Ussa michaelinus*. San Miguel de Murcia, Tarlac, Luzon.  
*Ussa microdontus*. Batangas, Luzon.  
*Ussa nublanus*. La Laguna, Luzon.  
*Ussa ramosianus*. Nueva Ecija, Luzon.  
*Ussa rosarianus*. Nueva Ecija, Luzon.  
*Ussa roxasianus*. Batangas, Luzon.  
*Ussa rubiginosus*. Bataan and Nueva Ecija, Luzon.  
*Cervus soloensis*. Sulu.

1885. *C[ervus] soloensis* HEUDE, Catalog. des Cerfs Tachetés, p. 1.

1894. *Sikelaphus soloensis* HEUDE, Mem. Hist. Nat. Emp. Chinois, vol. 2, pt. 3, p. 147.

- Ussa spatharius*. La Laguna, Luzon.  
*Ussa telesforianus*. Batangas (?), Luzon.  
*Ussa tuasoninus*. Batangas, Luzon.  
*Ussa verzosanus*. Nueva Ecija, Luzon.  
*Ussa vidalinus*. San Miguel de Murcia, Tarlac, Luzon.  
*Ussa villemerianus*. San Miguel de Murcia, Tarlac, Luzon.

#### Family BOVIDÆ.

##### BUBALUS MAINITENSIS Heude.

*Type-locality*.—Lake Mainit, Mindanao (domesticated).

##### BUBALUS MOELLENDORFFI Nehring.

*Type-locality*.—Busuanga Island, Calamianes. Also recorded from Culion.

## EXPLANATION OF PLATES.

## PLATE 27.

Skull of type-specimen of *Pithecus mindorus*, U.S.N.M. Cat. No. 144674, from Alag River, Mindoro (two-thirds natural size).

Fig. 1. Dorsal view.

2. Ventral view.

## PLATE 28.

Skull of type-specimen of *Pithecus mindorus*, U.S.N.M. Cat. No. 144674, from Alag River, Mindoro (two-thirds natural size).

Fig. 1. Left mandibular ramus.

2. Mandible, dorsal view.

3. Skull, lateral view.

## PLATE 29.

Skull and teeth of type-specimen of *Rusa nigellus*, U.S.N.M. Cat. No. 144711, from Mount Malindang, Mindanao.

Fig. 1. Skull, dorsal view (one-third natural size).

2. Left mandibular ramus (one-third natural size).

3. Right maxillary tooth row (natural size).